



Long Term Resource Monitoring Program

Program Report

2000-P004

1998 Annual Status Report

*A Summary of Fish Data in Six Reaches of the
Upper Mississippi River System*



DISTRIBUTION STATEMENT A

Approved for Public Release
Distribution Unlimited

June 2000

20000802 209

*The Upper Midwest Environmental Sciences Center issues LTRMP Program Reports
to provide Long Term Resource Monitoring Program partners
with programmatic documentation, procedures manuals, and annual status reports.*

**Upper Midwest Environmental
Sciences Center**

CENTER DIRECTOR
Leslie E. Holland-Bartels

PROGRAM MANAGER
Robert L. Delaney

CHIEF, AQUATIC SCIENCES BRANCH
James G. Wiener

CHIEF, SUPPORT SERVICES
Barbara A. Deml

REPORT EDITOR
Deborah K. Harris

Cover graphic by Mi Ae Lipe-Butterbrodt

Mention of trade names or commercial products does not constitute endorsement
or recommendation for use by the U.S. Department of the Interior, U.S. Geological Survey.

1998 Annual Status Report
*A Summary of Fish Data in Six Reaches of the
Upper Mississippi River System*

by

Randy W. Burkhardt, Steve DeLain, Eric Kramer,
Andrew Bartels, Melvin C. Bowler, Frederick A. Cronin,
Michael D. Petersen, David P. Herzog, Timothy M. O'Hara, and Kevin S. Irons

June 2000

U.S. Geological Survey
Upper Midwest Environmental Sciences Center
2630 Fanta Reed Road
La Crosse, Wisconsin 54603

Suggested citation:

Burkhardt, R. W., S. DeLain, E. Kramer, A. Bartels, M. C. Bowler, F. A. Cronin, M. D. Petersen, D. P. Herzog, T. M. O'Hara, and K. S. Irons. 2000. 1998 Annual Status Report: A summary of fish data in six reaches of the Upper Mississippi River System. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin, June 2000. LTRMP 2000-P004. 14 pp. + Chapters 1-6

Additional copies of this report may be obtained from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (1-800-553-6847 or 703-487-4650). Also available to registered users from the Defense Technical Information Center, Attn: Help Desk, 8725 Kingman Road, Suite 0944, Fort Belvoir, VA 22060-6218 (1-800-225-3842 or 703-767-9050).

Contents

	<i>Page</i>
Preface	v
Introduction	2
Study Areas	2
Methods	4
Sampling Methods	4
Electrofishing	11
Hoop Netting	11
Seining	11
Fyke Netting	11
Mini Fyke Netting	11
Trawling	11
Gill Netting	12
Trammel Netting	12
Statistical Methods	12
Acknowledgments	13
References	13
Chapter 1. Pool 4, Upper Mississippi River	1-1
Chapter 2. Pool 8, Upper Mississippi River	2-1
Chapter 3. Pool 13, Upper Mississippi River	3-1
Chapter 4. Pool 26, Upper Mississippi River	4-1
Chapter 5. Mississippi River Open Reach	5-1
Chapter 6. La Grange Pool, Illinois River	6-1

Preceding Page's Blank

Tables

	<i>Page</i>
1. Key features of the floodplain and aquatic area compositions of the Long Term Resource Monitoring Program's five Mississippi and Illinois River study reaches	4
2. Long Term Resource Monitoring Program list of fishes, arranged phylogenetically by family, then alphabetically by genus and species	5

Figure

Figure. Long Term Resource Monitoring Program study reaches.	3
---	---

Preface

This report is a product of the Long Term Resource Monitoring Program (LTRMP) for the Upper Mississippi River System. The LTRMP was authorized under the Water Resources Development Act of 1986 (Public Law 99-662) as an element of the U.S. Army Corps of Engineers' Environmental Management Program. The LTRMP is being implemented by the Upper Midwest Environmental Sciences Center, a U.S. Geological Survey science center, in cooperation with the five Upper Mississippi River System (UMRS) States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The U.S. Army Corps of Engineers provides guidance and has overall Program responsibility. The mode of operation and respective roles of the agencies are outlined in a 1988 Memorandum of Agreement.

The UMRS encompasses the commercially navigable reaches of the Upper Mississippi River, as well as the Illinois River and navigable portions of the Kaskaskia, Black, St. Croix, and Minnesota Rivers. Congress has declared the UMRS to be both a nationally significant ecosystem and a nationally significant commercial navigation system. The mission of the LTRMP is to provide decision makers with information for maintaining the UMRS as a sustainable large river ecosystem given its multiple-use character. The long-term goals of the Program are to understand the system, determine resource trends and effects, develop management alternatives, manage information, and develop useful products.

Data (factual record) and information (usable interpretation of data) are the primary products of the LTRMP. Data on water quality, vegetation, aquatic macroinvertebrates, and fish are collected using a network of six field stations on the Upper Mississippi and Illinois Rivers. Analysis, interpretation, and the reporting of information are conducted at the six field stations and at the Upper Midwest Environmental Sciences Center, the operational center of the LTRMP. Informational products of the LTRMP include professional presentations, reports, and publications in the open and peer-reviewed scientific literature.

This document is an annual status report for 1998, containing a synthesis of data from fish populations and communities in the Upper Mississippi River System. This report satisfies, for 1998, Task 2.2.8.4, *Evaluate and Summarize Annual Results* under Goal 2, *Monitor Resource Change* as specified in the Operating Plan for the Long Term Resource Monitoring Program (U.S. Fish and Wildlife Service 1993). This report was developed with funding provided by the Long Term Resource Monitoring Program. The purposes of this annual synthesis report are to provide (1) a systemwide summary of data in standardized tables and figures and (2) initial identification and interpretation of observed spatial and temporal patterns. The primary data summarized in this report are available from the Upper Midwest Environmental Sciences Center.

1998 Annual Status Report

A Summary of Fish Data in Six Reaches of the Upper Mississippi River System

by

Randy W. Burkhardt

U.S. Geological Survey

*Upper Midwest Environmental Sciences Center
2630 Fanta Reed Road, La Crosse, Wisconsin 54603*

Steve DeLain

Minnesota Department of Natural Resources

LTRMP Lake City Field Station

1801 S. Oak Street, Lake City, Minnesota 55041

Eric Kramer and Andrew Bartels

Wisconsin Department of Natural Resources

LTRMP Pool 8 Field Station

575 Lester Avenue, Onalaska, Wisconsin 54650

Melvin C. Bowler

Iowa Department of Natural Resources

LTRMP Mississippi River Monitoring Field Station

206 Rose Street, Bellevue, Iowa 52031

Frederick A. Cronin

Illinois Natural History Survey

LTRMP Great Rivers Field Station

8450 Montclair, Brighton, Illinois 62012

Michael D. Petersen and David P. Herzog

Missouri Department of Conservation

LTRMP Open River Field Station

3815 E. Jackson Boulevard, Jackson, Missouri 63755

Timothy M. O'Hara and Kevin S. Irons

Illinois Natural History Survey

LTRMP Havana Field Station

704 N. Schrader Avenue, Havana, Illinois 62644

Abstract: The Long Term Resource Monitoring Program (LTRMP) completed 2,664 collections of fishes from stratified random and permanently fixed sampling locations in six study reaches of the Upper Mississippi River System during 1998. Collection methods included day and night electrofishing, hoop netting, fyke netting (two net sizes), gill netting, seining, and trawling in select aquatic area classes. The six LTRMP study reaches are Pools 4 (excluding Lake Pepin), 8, 13, and 26 of the Upper Mississippi River, an unimpounded reach of the Mississippi River near Cape Girardeau, Missouri, and the La Grange Pool of the Illinois River. A total of 63–75 fish species were detected in each study reach. For each of the six LTRMP study reaches, this report contains summaries of (1) sampling efforts for each combination of gear type and aquatic area class, (2) total catches of each species from each gear type, (3) mean catch-per-unit of effort statistics and standard errors for common species from each combination of aquatic area class and selected gear type, and (4) length distributions of common species from selected gear types.

Key words: 1998 annual report, fish, LTRMP, Mississippi River

Introduction

The objective of this report is to summarize key features of fish populations and communities from samples collected by field stations of the Long Term Resource Monitoring Program (LTRMP) from the Upper Mississippi River System (UMRS). The fisheries component of the LTRMP is charged, in part, with monitoring and reporting trends in the status of selected fish populations and fish communities of the UMRS (U.S. Fish and Wildlife Service 1993). Intended as a data summary, this report contains only minimal descriptive syntheses. The LTRMP is required to produce trend reports at 5-year intervals that contain quantitative analyses and systemic syntheses of temporal changes. Further, the LTRMP uses these monitoring data in analyses to address specific issues of concern to LTRMP partners; these analyses are reported in special reports and in the open scientific literature.

Fish are the primary biotic object of recreational and commercial use on the UMRS. During 1982, UMRS fisheries provided more than 8.5 million activity days of sportfishing that generated more than \$150 million in direct expenditures (Fremling et al. 1989). Commercial fisheries of the UMRS were valued at more than \$2.4 million in 1987 (Upper Mississippi River Conservation Committee 1989). Adverse trends in fisheries of the UMRS would have detrimental effects on recreation and the regional economy. Therefore, it is important to detect any adverse trends as they occur so that remedial actions can be considered.

Monitoring of and research on fish are also important because fish often affect other ecosystem elements. Although documentation of the effects of fish on other biota is derived primarily from lakes and reservoirs (Northcote 1988), and traditional thought maintains that the dynamics of river biota are influenced primarily by abiotic factors, recent evidence shows that the dynamics of fish assemblages in temperate rivers are regulated in part by biotic factors (Welcomme et al. 1989). Fish may exert influences on other biota in riverine ecosystems and may, therefore, be of broad ecological importance. For example, evidence shows that common carp (*Cyprinus carpio*), an

abundant species in the UMRS, may depress or even eliminate macrophytes either through uprooting or disturbance of substrate (Cahn 1929; Macrae 1979). Effects of fish on benthic macroinvertebrates are well known (Northcote 1988). Therefore, trends in abundance of fish may be crucial in explaining trends in abundance of other riverine biota.

Resource monitoring is an important component of long-term ecological research on processes governing large-scale ecosystems. It is nearly impossible to perform experimental manipulations of the UMRS on large spatial scales and to incorporate replication. Long-term data from standardized sampling programs that span natural or anthropogenic disturbances are the only means for gaining an understanding of large-scale processes governing large river systems (Sparks et al. 1990). Further, the LTRMP fisheries component will provide support for the formulation and investigation of research hypotheses concerning smaller scales using focused experimentation. Therefore, the combination of routine monitoring coupled with more intensive investigation of consequences of disturbances and experimentation at reduced spatial and temporal scales is the only available means for better understanding the UMRS and for identifying viable management alternatives.

Study Areas

The LTRMP study areas include six river reaches within the Upper Mississippi River System, five on the Mississippi River and one on the Illinois River (Figure). Study areas are referred to herein by the navigation pool designations according to the U.S. Army Corps of Engineers lock and dam system. Mississippi River navigation pools studied are Pool 4 (river mile 752 to 797), Pool 8 (679 to 703), Pool 13 (523 to 557), Pool 26 (202 to 242), and an unimpounded, open river reach (29 to 80). The remaining study area is the La Grange Pool of the Illinois River (80 to 158).

The LTRMP study areas were chosen, in part, to reflect important differences in geomorphology, floodplain land-use practices, and navigation management strategies that exist within the UMRS (Table 1). Pools 4, 8, and 13 are located in an upper



Figure. Long Term Resource Monitoring Program study reaches.

impounded reach characterized by high percentages of open water and aquatic vegetation and low agricultural use (Figure). Relatively high percentages of the total aquatic area in these study reaches are composed of contiguous (to the main channel) backwaters, and relatively low percentages are composed of main channel. Qualitatively, Pools 4, 8, and 13 are geomorphically complex and richly braided by side channels and backwaters. Pool 26, in a lower impounded reach, is characterized by relatively low percentages of open water and aquatic vegetation and a high percentage of agriculture in the floodplain. A low percentage of the total aquatic area is composed of contiguous backwaters, and commensurately, a high percentage is composed of the main channel. The Open River study reach is characterized by low percentages of open water and aquatic vegetation and 71.5% agriculture in the floodplain. Of the total aquatic area in the Open River study reach, only 1.8% is contiguous backwater and 79% is main channel (Table 1). The La Grange Pool is similar to Pool 26 in floodplain composition, but is similar to Pools 8 and 13 in composition of the aquatic area (Table 1). In fact, the La Grange Pool has the greatest percentage (52.2%) of contiguous backwaters among the six LTRMP study areas.

Sampling sites are randomly selected within nine strata for each study area: backwater contiguous shoreline (BWCS), backwater contiguous offshore (BWC0), impounded shoreline (IMPS), impounded offshore (IMPO), main channel border unstructured

(MCBU), main channel border wing dam (MCBW), side channel border (SCB), tributary mouth (TRI), and tailwater (TWZ). The definitions of sampling strata are based on geomorphic regions that have been mapped and entered into a Geographic Information System.

Methods

Sampling Methods

The LTRMP fish monitoring design and sampling protocols, including historical changes, are given in Gutreuter et al. (1995). Readers requiring detailed descriptions should refer to that report. An abbreviated description of the LTRMP design and protocols follows; a list of common and scientific names of fish used in this report is found in Table 2.

In this report, we summarize the annual increment of fish data obtained by the LTRMP from stratified random and fixed-site sampling during 1998. The LTRMP converted to a stratified, random fish sampling design in 1993, augmented with limited sampling at a few permanently fixed sites. Selected aquatic areas, chosen for their enduring geomorphic features (Wilcox 1993), were used as sampling strata. These aquatic areas were largely compatible with the habitat classes used in 1990–92, with the exception of the 1990–92 classifications, which were based on the presence of aquatic vegetation; those fixed sites were reclassified into strata according to aquatic areas. Each aquatic area is artificially partitioned into 50-m² sampling grids

Table 1. Key features of the floodplain and aquatic area compositions of the Long Term Resource Monitoring Program's five Mississippi and Illinois River study reaches. Aquatic area is that portion of the floodplain that is inundated at normal water elevations. Main channel includes area in the navigation channel and main channel border areas. Data on floodplain composition are from Lastrup and Lowenberg (1994). Data on the composition of aquatic areas are from the Long Term Resource Monitoring Program aquatic areas spatial database.

Study reach	Floodplain area (ha)	Floodplain composition (%)			Aquatic area composition (%)	
		Open water	Aquatic vegetation	Agriculture	Contiguous backwater	Main channel
Pool 4	28,358	50.5	10.0	12.1	21.3	10.5
Pool 8	19,068	40.1	14.4	0.9	30.6	14.2
Pool 13	34,528	29.7	8.6	27.9	28.5	24.7
Pool 26	51,688	13.4	1.4	65.4	17.3	54.4
Open River	105,244	9.9	0.6	71.5	1.8	79.0
La Grange Pool, Illinois River	89,554	15.7	2.2	59.6	52.2	21.3

Table 2. Long Term Resource Monitoring Program list of fishes, arranged phylogenetically by family, then alphabetically by genus and species. Hybrids are listed after respective genera. Nomenclature follows Robins et al. (1991).

Common name	Family name	Scientific name
Petromyzontidae		
Chestnut lamprey		<i>Ichthyomyzon castaneus</i>
Northern brook lamprey		<i>I. fossor</i>
Silver lamprey		<i>I. unicuspis</i>
Least brook lamprey		<i>Lampetra aepyptera</i>
American brook lamprey		<i>L. appendix</i>
Sea lamprey		<i>Petromyzon marinus</i>
Carcharhinidae		
Bull shark		<i>Carcharhinus leucas</i>
Acipenseridae		
Lake sturgeon		<i>Acipenser fulvescens</i>
Pallid sturgeon		<i>Scaphirhynchus albus</i>
Shovelnose sturgeon		<i>S. platorynchus</i>
Polyodontidae		
Paddlefish		<i>Polyodon spathula</i>
Lepisosteidae		
Spotted gar		<i>Lepisosteus oculatus</i>
Longnose gar		<i>L. osseus</i>
Shortnose gar		<i>L. platostomus</i>
Alligator gar		<i>L. spatula</i>
Amiidae		
Bowfin		<i>Amia calva</i>
Hiodontidae		
Goldeye		<i>Hiodon alosoides</i>
Mooneye		<i>H. tergisus</i>
Anguillidae		
American eel		<i>Anguilla rostrata</i>
Clupeidae		
Alabama shad		<i>Alosa alabamae</i>
Skipjack herring		<i>A. chrysocloris</i>
Alewife		<i>A. pseudoharengus</i>
Gizzard shad		<i>Dorosoma cepedianum</i>
Threadfin shad		<i>D. petenense</i>

Table 2. Continued.

Common name	Family name	Scientific name
Cyprinidae		
Central stoneroller		<i>Campostoma anomalum</i>
Largescale stoneroller		<i>C. oligolepis</i>
Goldfish		<i>Carassius auratus</i>
Lake chub		<i>Couesius plumbeus</i>
Grass carp		<i>Ctenopharyngodon idella</i>
Red shiner		<i>Cyprinella lutrensis</i>
Spotfin shiner		<i>C. spiloptera</i>
Blacktail shiner		<i>C. venusta</i>
Steelcolor shiner		<i>C. whipplei</i>
Common carp		<i>Cyprinus carpio</i>
Goldfish × common carp		<i>Carassius auratus × C. carpio</i>
Gravel chub		<i>Erimystax x-punctatus</i>
Western silvery minnow		<i>Hybognathus argyritis</i>
Brassy minnow		<i>H. hankinsoni</i>
Mississippi silvery minnow		<i>H. nuchalis</i>
Plains minnow		<i>H. placitus</i>
Silver carp		<i>Hopophthalmichthys molitrix</i>
Bighead carp		<i>H. nobilis</i>
Striped shiner		<i>Luxilus chrysocephalus</i>
Common shiner		<i>L. cornutus</i>
Rosefin shiner		<i>Lythrurus ardens</i>
Ribbon shiner		<i>L. fumeus</i>
Redfin shiner		<i>L. umbratilis</i>
Speckled chub		<i>Macrhybopsis aestivalis</i>
Sturgeon chub		<i>M. gelida</i>
Sicklefin chub		<i>M. meeki</i>
Silver chub		<i>M. storeriana</i>
Pearl dace		<i>Margariscus margarita</i>
Hornyhead chub		<i>Nothonotus biguttatus</i>
River chub		<i>N. micropogon</i>
Golden shiner		<i>Notemigonus crysoleucas</i>
Bigeye chub		<i>Notropis amblops</i>
Pallid shiner		<i>N. amnis</i>
Pugnose shiner		<i>N. anogenus</i>
Emerald shiner		<i>N. atherinoides</i>
River shiner		<i>N. blennius</i>
Bigeye shiner		<i>N. boops</i>
Silverjaw minnow		<i>N. buccatus</i>
Ghost shiner		<i>N. buchanani</i>
Ironcolor shiner		<i>N. chalybaeus</i>
Bigmouth shiner		<i>N. dorsalis</i>
Blackchin shiner		<i>N. heterodon</i>
Blacknose shiner		<i>N. heterolepis</i>
Bluehead shiner		<i>N. hubbsi</i>
Spottail shiner		<i>N. hudsonius</i>
Ozark minnow		<i>N. nubilus</i>
Rosyface shiner		<i>N. rubellus</i>
Silverband shiner		<i>N. shumardi</i>
Sand shiner		<i>N. stramineus</i>
Weed shiner		<i>N. texanus</i>
Mimic shiner		<i>N. volucellus</i>

Table 2. Continued.

Common name	Family name	Scientific name
Channel shiner		<i>N. wickliffi</i>
Pugnose minnow		<i>Opsopoeodus emiliae</i>
Suckermouth minnow		<i>Phenacobius mirabilis</i>
Northern redbelly dace		<i>Phoxinus eos</i>
Southern redbelly dace		<i>P. erythrogaster</i>
Bluntnose minnow		<i>Pimephales notatus</i>
Fathead minnow		<i>P. promelas</i>
Bullhead minnow		<i>P. vigilax</i>
Flathead chub		<i>Platygobio gracilis</i>
Blacknose dace		<i>Rhinichthys atratulus</i>
Longnose dace		<i>R. cataractae</i>
Creek chub		<i>Semotilus atromaculatus</i>
Catostomidae		
River carpsucker		<i>Carpiodes carpio</i>
Quillback		<i>C. cyprinus</i>
Highfin carpsucker		<i>C. velifer</i>
Longnose sucker		<i>Catostomus catostomus</i>
White sucker		<i>C. commersoni</i>
Blue sucker		<i>Cycleptus elongatus</i>
Creek chubsucker		<i>Erimyzon oblongus</i>
Lake chubsucker		<i>E. suetta</i>
Northern hog sucker		<i>Hypentelium nigricans</i>
Smallmouth buffalo		<i>Ictiobus bubalus</i>
Bigmouth buffalo		<i>I. cyprinellus</i>
Black buffalo		<i>I. niger</i>
Spotted sucker		<i>Minytrema melanops</i>
Silver redhorse		<i>Moxostoma anisurum</i>
River redhorse		<i>M. carinatum</i>
Black redhorse		<i>M. duquesnei</i>
Golden redhorse		<i>M. erythrurum</i>
Shorthead redhorse		<i>M. macrolepidotum</i>
Greater redhorse		<i>M. valenciennesi</i>
Ictaluridae		
White catfish		<i>Ameiurus catus</i>
Black bullhead		<i>A. melas</i>
Yellow bullhead		<i>A. natalis</i>
Brown bullhead		<i>A. nebulosus</i>
Blue catfish		<i>Ictalurus furcatus</i>
Channel catfish		<i>I. punctatus</i>
Mountain madtom		<i>Noturus eleutherus</i>
Slender madtom		<i>N. exilis</i>
Stonecat		<i>N. flavus</i>
Tadpole madtom		<i>N. gyrinus</i>
Brindled madtom		<i>N. miurus</i>
Freckled madtom		<i>N. nocturnus</i>
Northern madtom		<i>N. stigmosus</i>
Flathead catfish		<i>Pylodictis olivaris</i>

Table 2. Continued.

Common name	Family name	Scientific name
Esocidae		
Grass pickerel		<i>Esox americanus vermiculatus</i>
Northern pike		<i>E. lucius</i>
Muskellunge		<i>E. masquinongy</i>
Tiger muskellunge		<i>E. masquinongy</i> × <i>E. lucius</i>
Chain pickerel		<i>E. niger</i>
Umbridae		
Central mudminnow		<i>Umbra limi</i>
Osmeridae		
Rainbow smelt		<i>Osmerus mordax</i>
Salmonidae		
Cisco		<i>Coregonus artedi</i>
Bloater		<i>C. hoyi</i>
Coho salmon		<i>Oncorhynchus kisutch</i>
Rainbow trout		<i>O. mykiss</i>
Brown trout		<i>Salmo trutta</i>
Brook trout		<i>Salvelinus fontinalis</i>
Percopsidae		
Trout-perch		<i>Percopsis omiscomaycus</i>
Aphredoderidae		
Pirate perch		<i>Aphredoderus sayanus</i>
Amblyopsidae		
Spring cavefish		<i>Chologaster agassizi</i>
Gadidae		
Burbot		<i>Lota lota</i>
Cyprinodontidae		
Northern studfish		<i>Fundulus catenatus</i>
Banded killifish		<i>F. diaphanus</i>
Starhead topminnow		<i>F. dispar</i>
Blackstripe topminnow		<i>F. notatus</i>
Blackspotted topminnow		<i>F. olivaceus</i>
Poeciliidae		
Western mosquitofish		<i>Gambusia affinis</i>

Table 2. Continued.

Common name	Family name	Scientific name
Atherinidae		
Brook silverside		<i>Labidesthes sicculus</i>
Mississippi silverside		<i>Menidia audens</i>
Inland silverside		<i>M. beryllina</i>
Gasterosteidae		
Brook stickleback		<i>Culaea inconstans</i>
Ninespine stickleback		<i>Pungitius pungitius</i>
Cottidae		
Mottled sculpin		<i>Cottus bairdi</i>
Banded sculpin		<i>C. carolinae</i>
Slimy sculpin		<i>C. cognatus</i>
Deepwater sculpin		<i>Myoxocephalus thompsoni</i>
Percichthyidae		
White perch		<i>Morone americana</i>
White bass		<i>M. chrysops</i>
Yellow bass		<i>M. mississippiensis</i>
Striped bass		<i>M. saxatilis</i>
White bass × striped bass		<i>M. chrysops × M. saxatilis</i>
Centrarchidae		
Shadow bass		<i>Ambloplites ariommus</i>
Rock bass		<i>A. rupestris</i>
Flier		<i>Centrarchus macropterus</i>
Banded pygmy sunfish		<i>Elassoma zonatum</i>
Green sunfish		<i>Lepomis cyanellus</i>
Pumpkinseed		<i>L. gibbosus</i>
Warmouth		<i>L. gulosus</i>
Orangespotted sunfish		<i>L. humilis</i>
Bluegill		<i>L. macrochirus</i>
Longear sunfish		<i>L. megalotis</i>
Redear sunfish		<i>L. microlophus</i>
Spotted sunfish		<i>L. punctatus</i>
Bantam sunfish		<i>L. symmetricus</i>
Green sunfish × pumpkinseed		<i>L. cyanellus × L. gibbosus</i>
Green sunfish × warmouth		<i>L. cyanellus × L. gulosus</i>
Green sunfish × orangespotted sunfish		<i>L. cyanellus × L. humilis</i>
Green sunfish × bluegill		<i>L. cyanellus × L. macrochirus</i>
Green sunfish × redear sunfish		<i>L. cyanellus × L. microlophus</i>
Green sunfish × unknown		<i>L. cyanellus × sp.</i>
Pumpkinseed × warmouth		<i>L. gibbosus × L. gulosus</i>
Pumpkinseed × orangespotted sunfish		<i>L. gibbosus × L. humilis</i>
Pumpkinseed × bluegill		<i>L. gibbosus × L. macrochirus</i>
Orangespotted sunfish × longear sunfish		<i>L. humilis × L. megalotis</i>
Bluegill × warmouth		<i>L. macrochirus × L. gulosus</i>
Bluegill × orangespotted sunfish		<i>L. macrochirus × L. humilis</i>

Table 2. Continued.

Common name	Family name	Scientific name
Bluegill × longear sunfish		<i>L. macrochirus</i> × <i>L. megalotis</i>
Bluegill × redear sunfish		<i>L. macrochirus</i> × <i>L. microlophus</i>
Redear sunfish × warmouth		<i>L. microlophus</i> × <i>L. gulosus</i>
Smallmouth bass		<i>Micropterus dolomieu</i>
Spotted bass		<i>M. punctulatus</i>
Largemouth bass		<i>M. salmoides</i>
White crappie		<i>Pomoxis annularis</i>
Black crappie		<i>P. nigromaculatus</i>
White crappie × black crappie		<i>P. annularis</i> × <i>P. nigromaculatus</i>
Percidae		
Crystal darter		<i>Ammocrypta asprella</i>
Western sand darter		<i>A. clara</i>
Eastern sand darter		<i>A. pelucida</i>
Mud darter		<i>Etheostoma asprigene</i>
Greenside darter		<i>E. blennioides</i>
Rainbow darter		<i>E. caeruleum</i>
Bluebreast darter		<i>E. camurum</i>
Bluntnose darter		<i>E. chlorosomum</i>
Iowa darter		<i>E. exile</i>
Fantail darter		<i>E. flabellare</i>
Slough darter		<i>E. gracile</i>
Harlequin darter		<i>E. histrio</i>
Stripetail darter		<i>E. kennicotti</i>
Least darter		<i>E. microperca</i>
Johnny darter		<i>E. nigrum</i>
Cypress darter		<i>E. proelaire</i>
Orangethroat darter		<i>E. spectabile</i>
Spottail darter		<i>E. squamiceps</i>
Banded darter		<i>E. zonale</i>
Yellow perch		<i>Perca flavescens</i>
Logperch		<i>Percina caprodes</i>
Blackside darter		<i>P. maculata</i>
Slenderhead darter		<i>P. phoxocephala</i>
Dusky darter		<i>P. sciera</i>
River darter		<i>P. shumardi</i>
Sauger		<i>Stizostedion canadense</i>
Walleye		<i>S. vitreum</i>
Sauger × walleye		<i>S. canadense</i> × <i>S. vitreum</i>
Sciaenidae		
Freshwater drum		<i>Aplodinotus grunniens</i>
Mugilidae		
Striped mullet		<i>Mugil cephalus</i>

beginning with a random origin for each LTRMP study reach (Gutreuter et al. 1995) using the ARC Geographic Information System. Beginning in 1993, sampling sites were randomly chosen from this lattice of square grids. Whenever it is discovered that a randomly selected site cannot be sampled because of environmental constraints (e.g., limited physical access or high flow), the nearest accessible site from a list of randomly selected alternate sites is sampled within the same aquatic area class.

Since 1990, the LTRMP uses day and night electrofishing, fyke nets, seines, small mini fyke nets, hoop nets, and small trawls to sample fish in various strata. The following is a summary of sampling gears according to Gutreuter et al. (1995):

Electrofishing

Electrofishing is conducted with pulsed direct current; boat configuration and power output are standardized (Burkhardt and Gutreuter 1995; Gutreuter et al. 1995). Electrofishing effort is of 15-min duration and is paced so that the boat covers a rectangle of about 200×30 m. Day and night electrofishing data from these two methods were combined for length-frequency analysis. The unit of effort is a 15-min run.

Hoop Netting

The LTRMP uses two sizes of hoop nets. The large nets are composed of seven fiberglass hoops with diameters of 1.1 to 1.2 m. These nets are 4.8 m long, contain two finger-style throats, and are constructed of 3.7-cm (bar measure) nylon mesh. The small nets are composed of seven fiberglass hoops with diameters of 0.5 to 0.6 m. The small nets are 3 m long, contain two finger-style throats, and are constructed of 1.8-cm (bar measure) nylon mesh. Hoop nets are deployed separately but in pairs within sampling sites. Both nets are baited with 3 kg of soybean cake. Because of gear inefficiency, hoop net sets in BWCO areas were optional during 1998. For this report, the estimates from pairs of nets are pooled and therefore treated as a single gear for consistency with the 1990–92 data. The unit of effort is a net-day, which is 24 h of effort by a pair of nets.

Seining

The LTRMP uses 10.7-m-long seines constructed of 3-mm Ace-type nylon mesh. These seines are 1.8 m high and have a 0.9-m² bag in the centers. Seines are extended perpendicularly to shorelines and then swept in a 90° arc downstream to the shoreline. The unit of effort is a haul.

Fyke Netting

The LTRMP uses Wisconsin-type fyke nets (trap nets) that contain three sections: the lead, frame, and cab. All netting is 1.8-cm (bar measure) mesh. Leads are 15 m long and 1.3 m high. The spring steel frames are 0.9 m high and 1.8 m wide with two internal wing throats. The cabs are constructed of six steel hoops (0.9 m in diameter) containing two throats. These nets are fished singly from shoreline or from beds of dense vegetation or in tandem (with leads connected) offshore. The unit of effort is a net-day, where each frame is one net. Fyke net and tandem fyke net data were combined for length-frequency distribution analysis.

Mini Fyke Netting

Mini fyke nets are small, Wisconsin-type fyke nets. Mesh size is 3-mm Ace-type nylon. The leads are 4.5 m long and 0.6 m high. The spring steel frames are 0.6 m high and 1.2 m wide with two internal wing throats. The cabs are constructed of two steel hoops (0.6 m in diameter) with one throat. These nets are fished singly from shoreline or from beds of dense vegetation or in tandem (with leads connected) offshore. The unit of effort is a net-day, where each frame is one net.

Trawling

Trawling is conducted only at permanently fixed sampling sites in tailwater zones and unstructured channel borders. The LTRMP trawls collect mainly small, bottom-dwelling fish. The trawls are two-seam, 4.8-m slingshot balloon trawls (TRL16BC, Memphis Net and Twine Co., Inc., or the equivalent). The body of the trawl is made of No. 9 nylon with stretch mesh 18 mm in diameter. The cod end is made of No. 18 nylon with stretch mesh

18 mm in diameter. The cod end contains a 1.8-m liner consisting of 3-mm Ace-type nylon mesh. Floats are spaced every 0.91 m along the headrope, and a 4.8-mm steel chain is tied to the footrope. The trawl is equipped with 37-cm-high by 75-cm-long iron "V" doors (otter boards). These trawls are dragged downriver by small, flat-bottomed boats. Trawl speed is barely faster than ambient current speed. The standard unit of trawl effort is a haul. A minimum of six hauls is collected in main or side channel sites and four hauls at tailwater sites.

Gill Netting

In 1993, gill nets became an optional experimental sampling gear. This option was included to improve monitoring capabilities for some large riverine species. Gill nets are 91.44 m long and consist of four, 22.86-m panels of monofilament mesh. The panels are 2.44 m deep. Each panel consists of different mesh of 10.2-, 20.3-, and 25.4-cm stretch measure. The 10.2- and 15.2-cm mesh are woven from No. 8 (9.07-kg [20-pound] test) transparent nylon monofilament. The 25.4-cm mesh is woven from No. 12 (13.61-kg [30-pound] test) transparent nylon monofilament. The top line is floating foam-core rope and the bottom line is 29.50-kg lead-core rope. Gill nets are set either perpendicularly (preferred) or parallel (in high-flow conditions) to the shoreline. The standard unit of gill netting effort is the net-day, where a day is 24 h.

Trammel Netting

In 1994, trammel nets became an optional experimental sampling gear. This option was included to improve monitoring capabilities for some large riverine species. Trammel nets may be anchored or drifted with the current.

Trammel nets are 91.44 × 2.44 m, inside netting is 10.16-cm bar of No. 8 monofilament hung about 85 m per 30.48 m of finished net, wall size is 35.56-cm bar of No. 9 multifilament twine hung 61 m per 30.48 yards of finished net, float line is 1.27 cm foam-core (two strands on the floating nets, one strand on the bottom set nets), and lead line is lead-

core (No. 20 on the floating net, No. 65 on the sinking net).

Statistical Methods

The LTRMP uses mean catch-per-unit-effort C/f as an index of abundance, as is conventional practice (Ricker 1975). The units of effort are specific to particular gears. For electrofishing and seining, effort is a constant, but for other gears it is somewhat variable. For example, although the effort goal for fyke nets is 1 day (Gutreuter et al. 1995), actual effort may vary between 20 and 30 h. Catch and effort are recorded for each species from individual samples (deployments of particular gears at unique combinations of time and place). Whenever a species is not caught in a sample, the catch for that species in that sample is zero. Although these zero catches are not recorded, they are reconstructed for analyses.

The estimates of pooled reachwide mean C/f were obtained from the conventional design-based estimator for stratified random samples (Cochran 1977). For an arbitrary random variable denoted y (for this report y represents C/f), the pooled mean, denoted \bar{y}_{st} (st represents stratified) is given by

$$\bar{y}_{st} = \frac{1}{N} \sum_{h=1}^L N_h \bar{y}_h \quad (1)$$

where N_h is the number of sampling units within stratum h , $N = \sum_{h=1}^L N_h$, and \bar{y}_h denotes the estimator of the simple mean of y for stratum h . The estimator of the variance of \bar{y}_{st} is

$$s^2(\bar{y}_{st}) = \frac{1}{N^2} \sum_{h=1}^L N_h (N_h - n_h) \left(\frac{s_h^2}{n_h} \right) \quad (2)$$

where

$$s_h^2 = \frac{\sum_{i=1}^{n_h} (y_{hi} - \bar{y}_h)^2}{n_h - 1}$$

is the usual estimator of the variance of y_h and n_h is the number of samples taken in stratum h (Cochran 1977). The standard error of \bar{y}_{st} is therefore $s(\bar{y}_{st})$. For LTRMP fish monitoring, the sampling units are 50-m² sampling grids.

In this report, C/f statistics are reported separately for the limited, fixed-site sampling and the primary stratified random sampling. Equation (1) is used to estimate means of data obtained from fixed-site sampling to maintain computational consistency. The pooled means from fixed-site sampling are not guaranteed unbiased because there is no assurance that the fixed sites were unbiased within the stratum. Equation (1) is also used to obtain estimates of overall mean catch-per-unit-effort from stratified random sampling. In random samples, equation (1) yields unbiased estimates of the pooled means regardless of the probability distribution of y (Cochran 1977).

Length distribution analysis was performed for 13 selected fish species (gear used): gizzard shad (electrofishing), common carp (electrofishing), smallmouth buffalo (electrofishing; small and large hoop netting), channel catfish (electrofishing; small and large hoop netting), northern pike (electrofishing; fyke and tandem fyke netting), white bass (electrofishing), bluegill (electrofishing; fyke and tandem fyke netting), largemouth bass (electrofishing), white crappie (electrofishing; fyke and tandem fyke netting), black crappie (electrofishing; fyke and tandem fyke netting), sauger (electrofishing), walleye (electrofishing), and freshwater drum (electrofishing; fyke and tandem fyke netting). The data are illustrated in the form of histograms within the following chapters. In some instances, meaningful biological interpretation of these distributions may be limited by small sample size or size selectivity of the gear (Anderson and Neumann 1996). Some fish histograms with small sample sizes (<100) are included in this report because of local interest, while others were omitted (reach dependent).

Acknowledgments

This report is a result of the efforts of the staff and partners of the Long Term Resource Monitoring Program (LTRMP) of the Upper Mississippi River. The LTRMP is a cooperative effort by the U.S. Geological Service—Biological Resources Division, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Illinois Department of Natural Resources, the Iowa Department of Natural

Resources, the Minnesota Department of Natural Resources, the Missouri Department of Conservation, and the Wisconsin Department of Natural Resources. Monitoring is conducted by six field stations operated by the participating state resource management and research agencies. We especially thank the staff at the LTRMP field stations for their sampling assistance and Steve Gutreuter for his efforts in writing most of the statistical analysis program used in this report.

References

Anderson, R. O., and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447–482 in B. R. Murphy and D. W. Willis, editors. *Fisheries techniques*. 2nd edition. American Fisheries Society, Bethesda, Maryland.

Burkhardt, R. W., and S. Gutreuter. 1995. Improving electrofishing catch consistency by standardizing power. *North American Journal of Fisheries Management* 15:375–381.

Cahn, A. R. 1929. The effect of carp on a small lake: The carp as a dominant. *Ecology* 10:271–274.

Cochran, W. G. 1977. *Sampling techniques*. 3rd edition. John Wiley & Sons, New York. 480 pp.

Fremling, C. R., J. L. Rasmussen, R. E. Sparks, S. P. Cobb, C. F. Bryan, and T. O. Claflin. 1989. Mississippi River fisheries: A case history. Pages 309–351 in D. P. Dodge, editor. *Proceedings of the International Large River Symposium*, Department of Fisheries and Oceans, Ottawa, Ontario, Canada. Canadian Special Publication of Fisheries and Aquatic Sciences 106.

Gutreuter, S., R. Burkhardt, and K. Lubinski. 1995. Long Term Resource Monitoring Program Procedures: Fish monitoring. National Biological Service, Environmental Management Technical Center, Onalaska, Wisconsin, July 1995. LTRMP 95-P002-1. 42 pp. + Appendixes A–J

Lastrup, M. S., and C. D. Lowenberg. 1994. Development of a systemic land cover/land use

database for the Upper Mississippi River System derived from Landsat Thematic Mapper satellite data. National Biological Survey, Environmental Management Technical Center, Onalaska, Wisconsin, May 1994. LTRMP 94-T001. 103 pp.

Macrae, D. A. 1979. The impact of carp on the summer production of aquatic vegetation as indicated by an enclosure experiment and food habits study. M.S. Thesis, Trent University, Peterborough, Ontario, Canada. 110 pp.

Northcote, T. G. 1988. Fish in the structure and function of freshwater ecosystems: A "top-down" view. Canadian Journal of Fisheries and Aquatic Sciences 45:361-379.

Pitlo J., A. Van Vooren, and J. Rasmussen. 1995. Distribution and relative abundance of Upper Mississippi River fishes. Upper Mississippi River Conservation Committee, Rock Island, Illinois. 20 pp.

Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Bulletin 191. Fisheries Research Board of Canada, Ottawa, Ontario. 382 pp.

Robins, C. R., R. M. Bailey, C. E. Bond, J. R. Brooker, E. A. Lachner, R. N. Lea, and W. B. Scott. 1991. Common and scientific names of fishes from the United States and Canada. 5th edition. Special Publication 20. American Fisheries Society, Bethesda, Maryland. 183 pp.

Smith, P. W. 1979. The fishes of Illinois. University of Illinois Press, Urbana. 314 pp.

Sparks, R. E., P. B. Bayley, S. L. Kohler, and L. L. Osborne. 1990. Disturbance and recovery of large floodplain rivers. Environmental Management 14:699-709.

Upper Mississippi River Conservation Committee. 1989. Upper Mississippi River commercial fisheries statistics for 1987. Pages 145-151 in Proceedings of the forty-fifth annual meeting of the Upper Mississippi River Conservation Committee. Upper Mississippi River Conservation Committee, Rock Island, Illinois.

U.S. Fish and Wildlife Service. 1993. Operating Plan for the Upper Mississippi River System Long Term Resource Monitoring Program. Environmental Management Technical Center, Onalaska, Wisconsin, Revised September 1993. EMTC 91-P002R. 179 pp. (NTIS #PB94-160199)

Welcomme, R. L., R. A. Ryder, and J. A. Sedell. 1989. Dynamics of fish assemblages in river systems—A synthesis. Pages 577-599 in D. P. Dodge, editor. Proceedings of the International Large River Symposium, Department of Fisheries and Oceans, Ottawa, Ontario, Canada. Canadian Special Publication of Fisheries and Aquatic Sciences 106.

Wilcox, D. B. 1993. An aquatic habitat classification system for the Upper Mississippi River System. U.S. Fish and Wildlife Service, Environmental Management Technical Center, Onalaska, Wisconsin, May 1993. EMTC 93-T003. 9 pp. + Appendix A (NTIS # PB93-208981)

Wlosinski, J. H., D. E. Hansen, and S. R. Hagedorn. 1995. Long Term Resource Monitoring Program Procedures: Water surface elevation and discharge. National Biological Service, Environmental Management Technical Center, Onalaska, Wisconsin, August 1995. LTRMP 95-P002-4. 9 pp. + Appendixes A-O

Chapter 1. Pool 4, Upper Mississippi River

by

Steve DeLain

Minnesota Department of Natural Resources
LTRMP Lake City Field Station
1801 S. Oak Street
Lake City, Minnesota 55041

Hydrograph

Water levels were below normal at the beginning of the first sampling period, then rose abruptly midway through the first period and dropped slightly below normal at the end of the first period (Figure 1.1). Throughout the second period water levels remained below the average, except for a short peak which occurred during the middle of period two. Third period water levels remained below average until the end of the period, when water levels rose slightly above average. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

Summary of Sampling Effort

In 1998, 382 collections were completed at randomly selected sites and 73 collections at fixed sites (Table 1.1). Fixed-site sampling consisted of 43 collections in the TWZ and 29 collections in the MCBW.

Total Catch by Gear

A total of 75,054 fish were collected comprising 68 species and 2 hybrids in 1998 (Table 1.2). Historically, about 99 species have been documented in Pool 4 (Pitlo et al. 1995). In 1998, the most numerically abundant species caught were the emerald shiner (55,893), bluegill (2,792), spotfin shiner (2,339), gizzard shad (2,004), and bullhead minnow (1,443). Total catches by gear type were: day electrofishing, 10,167; night electrofishing, 20,224; fyke net, 787; tandem fyke net, 1,728; mini fyke, 10,063; tandem mini fyke, 973; seine, 29,776; small hoop net, 224; large hoop net, 514; gill net, 544; trammel net, 35; and trawl, 19.

Random Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

A total of 55 species were collected using day electrofishing (Table 1.3.1). Species with the highest poolwide mean catch-per-unit-effort (C/f_s)

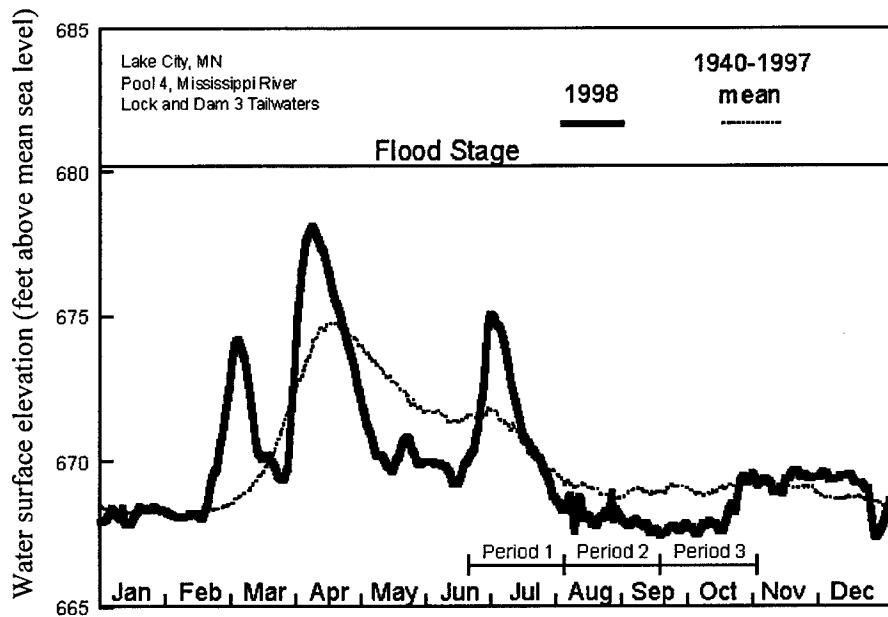


Figure 1.1. Daily water surface elevation from Lock and Dam 3 for Pool 4, Upper Mississippi River, during 1998 and mean elevation since 1940. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

in day electrofishing collections were the emerald shiner ($261/h = 4 \times 65.3$ per 15-min run), gizzard shad (46/h), and bluegill (27/h). The emerald shiner was the most commonly collected species by electrofishing in the SCB (528/h) and MCBU (331/h). Gizzard shad were the next most abundant in the MCBU (82/h) and SCB (48/h). Bluegill predominated in the BWCS (39/h). In the MCBW, the emerald shiner (45/h) had the highest *C/f*. Five species taken by electrofishing were not collected by any other gear. These were the silver lamprey, American brook lamprey, blue sucker, burbot, and slenderhead darter. One hybrid pumpkinseed \times bluegill was also collected exclusively by day electrofishing.

Fyke Net

Thirty species were collected from two strata in fyke nets (Table 1.3.2). Poolwide mean *C/f*s in fyke nets were highest for the black crappie (8/net-day), bluegill (7/net-day), and common carp (4/net-day). The black crappie had the highest stratumwide *C/f* in the BWCS (8/net-day), and the rock bass had the highest catch rate in the MCBW (1/net-day). Two hybrids, saugeye and green sunfish \times bluegill, were also collected by fyke nets.

Tandem Fyke Net

Tandem fyke nets were used solely in the BWC0 and 28 species were collected (Table 1.3.3). The most commonly caught species in tandem fyke nets were the bluegill (9/net-day), black crappie (9/net-day), and yellow perch (2/net-day). The orangespotted sunfish was collected exclusively in this gear type during 1998.

Mini Fyke Net

A total of 42 species were collected in mini fyke nets (Table 1.3.4). Poolwide *C/f*s were highest for the bluegill (27/net-day), emerald shiner (19/net-day), and bullhead minnow (9/net-day). The emerald shiner was the most abundant species in mini fyke net collections from the MCBU (9/net-day). The bluegill was the most common species in collections from the BWCS (6/net-day) and bullhead minnow was the most common in SCB (23/net-day). In the

MCBW, catches were low (<0.3/net-day) for all species in mini fyke nets, with the only recorded species being sauger (0.3/net-day) and spotfin shiner (0.2/net-day).

Tandem Mini Fyke Net

A total of 32 species were collected in tandem mini fyke nets in the BWC0 (Table 1.3.5). The most commonly collected species were the emerald shiner (11/net-day), freshwater drum (1/net-day), and bluegill (1/net-day).

Small Hoop Net

In small hoop nets, 13 species were collected (Table 1.3.6). The channel catfish was the most frequently caught species in the SCB (1/net-day), MCBU (0.5/net-day), and MCBW (0.2/net-day).

Large Hoop Net

A total of 18 species were collected in large hoop nets (Table 1.3.7). Poolwide, the most commonly caught species was the smallmouth buffalo (2/net-day). The common carp (2/net-day) was the most frequently collected species in the MCBU. The smallmouth buffalo had the highest *C/f* in the MCBW (1/net-day) and SCB (2/net-day).

Seine

A total of 40 species were collected in the seine (Table 1.3.8) during 1998. Poolwide *C/f*s in the seine were highest for the emerald shiner (345/haul), spotfin shiner (30/haul), and bullhead minnow (13/haul). The emerald shiner was the most frequently collected species in the MCBU (252/haul) and SCB (418/haul). Three species were collected exclusively in the seine: the bigmouth shiner, bluntnose minnow, and northern hog sucker.

Gill Net

Gill nets were set solely in the BWC0 and collected 23 species (Table 1.3.9). The highest *C/f*s were for the gizzard shad (19/net-day), common carp (7/net-day), white bass (6/net-day), and

smallmouth buffalo (3/net-day). One hybrid saugeye (sauger \times walleye) was collected in this gear during 1998.

Trammel Net

Trammel nets were set solely in the BWCO and collected 7 species (Table 1.3.10). The most frequently caught species were the common carp (11/net-day) and smallmouth buffalo (0.7/net-day).

Fixed Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

The C/fs for 25 species collected by day electrofishing at fixed sites in the MCBW are reported in Table 1.4.1. The highest C/fs were for the emerald shiner (191/h), gizzard shad (140/h), and white bass (42/h).

Night Electrofishing

A total of 34 species were collected by night electrofishing at fixed sites in the TWZ (Table 1.2). The most frequently caught species (Table 1.4.2) were the emerald shiner (8,758/h), gizzard shad (219/h), and bluegill (131/h). Two black buffalo were collected exclusively by night electrofishing. These were the only black buffalo collected since 1994.

Fyke Net

Fyke nets were set at fixed sites in the TWZ and MCBW and 16 species were collected. In the MCBW, the highest C/fs in fyke nets (Table 1.4.3) were for the black crappie (11/net-day), freshwater drum (8/net-day), and bluegill (7/net-day). The highest C/fs (Table 1.4.3) in the TWZ were for the freshwater drum (5/net-day), white bass (5/net-day), and black crappie (2/net-day).

Mini Fyke Net

Mini fyke nets at fixed sites in the MCBW collected 20 species and C/fs (Table 1.4.4) were highest for the emerald shiner (37/net-day), speckled

chub (18/net-day), and bullhead minnow (2/net-day). The most frequently collected species in mini fyke nets in the TWZ stratum were the emerald shiner (1,124/net-day), bullhead minnow (13/net-day), and mimic shiner (12/net-day).

Small Hoop Net

The common carp was the most frequently collected species in small hoop nets at fixed sites (Table 1.4.5) in the MCBW (1/net-day), and the common carp also had the highest C/f in the TWZ (3/net-day).

Large Hoop Net

In large hoop nets (Table 1.4.6), the freshwater drum had the highest C/f in the MCBW (2/net-day), and common carp had the highest (C/f) in the TWZ (13/net-day).

Trawl

Four species were collected in the TWZ using the trawl. The channel catfish (0.7/haul), freshwater drum (0.6/haul), shovelnose sturgeon (0.5/haul), and speckled chub (0.1/haul) were the only species caught in the trawl (Table 1.4.7).

Length Distributions of Selected Species

Gizzard Shad

The modal length of 1,586 gizzard shad collected by electrofishing was 12 cm, and the maximum length increment was 34 cm (Figure 1.2). An additional 418 unmeasured gizzard shad from subsampled collections are not included in this length distribution.

Common Carp

The modal length of 540 common carp collected by electrofishing was 52, 54, and 56 cm (Figure 1.3). The maximum length increment was 78 cm (Figure 1.3). Few common carp less than 44 cm were collected.

Smallmouth Buffalo

The length distribution of 21 smallmouth buffalo collected by electrofishing shows a modal grouping, at 48, 50, and 52 cm (Figure 1.4). The 139 smallmouth buffalo collected in hoop nets ranged in length from 36 to 64 cm, and the modal length was 50 cm (Figure 1.5).

Channel Catfish

Fourteen channel catfish collected by electrofishing ranged in length from 16 to 76 cm, with a modal length of 40 cm (Figure 1.6). The 106 channel catfish collected in hoop nets ranged in length from 18 to 68 cm, with a modal length of 42 cm (Figure 1.7).

Northern Pike

The length distribution of 47 northern pike collected by electrofishing ranged from 12 to 86 cm, with modes at 38, 52, and 54 cm (Figure 1.8). The lengths of 22 northern pike caught in fyke nets ranged in length from 22 to 90 cm, with a modal length of 60 cm (Figure 1.9).

White Bass

The length distribution of 396 white bass collected by electrofishing ranged from 2 to 40 cm, with a modal length of 12 cm (Figure 1.10).

Bluegill

The length distribution of 793 bluegills collected by electrofishing ranged from 0 to 20 cm, with a mode of 10 cm (Figure 1.11). The 736 bluegills collected in fyke nets ranged in length from 4 to 22 cm, with a modal length of 12 cm (Figure 1.12).

Largemouth Bass

The length distribution of 264 largemouth bass collected by electrofishing ranged from 4 to 42 cm, with a modal length of 10 cm. Most of the largemouth bass were between 6 and 14 cm in length (Figure 1.13).

Black Crappie

The length distribution of 724 black crappies collected in fyke nets ranged from 4 to 34 cm, with a modal length of 8 cm (Figure 1.14).

Sauger

The length distribution of 615 saugers collected by electrofishing ranged from 6 to 52 cm, with a modal length of 14 cm (Figure 1.15).

Walleye

The length distribution of 165 walleyes collected by electrofishing ranged from 8 to 66 cm, with a modal length of 36 cm (Figure 1.16). About 50% of walleyes collected were 38 cm or greater, which is the harvestable size limit for Minnesota–Wisconsin boundary waters.

Freshwater Drum

The length distribution of 188 freshwater drum collected by electrofishing ranged from 6 to 46 cm, with a modal length of 30 cm (Figure 1.17). Freshwater drum collected in fyke nets were from 10 to 42 cm in length, also with a modal length of 30 cm (Figure 1.18).

Table 1.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 4 of the Mississippi River during 1998. Table entries are numbers of successfully completed standardized monitoring collections.

Table page: 1

Sampling period=1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	7		8	8	4					27
Fyke net	6				4				2	12
Gill net		4								4
Large hoop net			6	4	4				2	16
Small hoop net			6	4	4				2	16
Mini fyke net	6		6	4	4				2	22
Night electrofishing									3	3
Seine			12	12						24
Trawling									4	4
Trammel net (set)		4								4
Tandem fyke net		10								10
Tandem mini fyke net		10								10
SUBTOTAL	19	28	38	32	20	0	0	0	15	152

Sampling period=2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		8	8	3					27
Fyke net	6				4				1	11
Gill net		4								4
Large hoop net			6	4	4				2	16
Small hoop net			6	4	4				2	16
Mini fyke net	6		6	4	4				2	22
Night electrofishing									4	4
Seine			12	12						24
Trawling									4	4
Trammel net (set)		4								4
Tandem fyke net		11								11
Tandem mini fyke net		10								10
SUBTOTAL	20	29	38	32	19	0	0	0	15	153

Sampling period=3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		8	8	4					28
Fyke net	6				4				2	12
Gill net		4								4
Large hoop net			6	4	4				1	15
Small hoop net			6	4	4				2	16
Mini fyke net	6		6	4	4				2	22
Night electrofishing									4	4
Seine			12	12						24
Trawling									2	2
Trammel net (set)		4								4
Tandem fyke net		9								9
Tandem mini fyke net		10								10
SUBTOTAL	20	27	38	32	20	0	0	0	13	150
	=====	=====	==	=====						
	59	84	114	96	59	0	0	0	43	455

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam

SCB - Side channel border

TRI - Tributary mouth

TWZ - Tailwater

Table 1.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling years actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	1	1	-	-	-	-	-	-	-	-	-	-	2
2	Silver lamprey	<i>Ichthyomyzon unicuspis</i>	3	-	-	-	-	-	-	-	-	-	-	-	3
3	American brook lamprey	<i>Lampera appendix</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
4	Shovelnose sturgeon	<i>Scaphirhynchus platorynchus</i>	5	1	4	2	1	2	2	2	2	-	-	-	6
5	Longnose gar	<i>Lepisosteus osseus</i>	5	1	2	9	16	1	-	-	-	-	-	-	19
6	Shortnose gar	<i>Lepisosteus platostomus</i>	1	2	-	-	-	-	-	-	-	-	-	-	29
7	Bowfin	<i>Amia calva</i>	13	1	17	19	1	-	-	-	-	-	-	-	60
8	Mooneye	<i>Hiodon tergisus</i>	10	1	1	-	-	-	-	-	-	-	-	-	16
9	American eel	<i>Anguilla rostrata</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
10	Gizzard shad	<i>Dorosoma cepedianum</i>	1032	554	4	15	28	20	141	-	-	210	-	-	2004
11	Spotfin shiner	<i>Cyprinella spiloptera</i>	95	1	-	-	-	-	-	-	-	-	-	-	2339
12	Common carp	<i>Cyprinus carpio</i>	432	108	78	25	98	1	2144	-	-	81	13	-	1048
13	Speckled chub	<i>Macrihybopsis aestivalis</i>	-	-	-	-	-	-	-	-	-	-	-	-	111
14	Silver chub	<i>Macrihybopsis storeriana</i>	10	1	1	-	-	-	-	-	-	-	-	-	22
15	Golden shiner	<i>Notemigonus crysoleucas</i>	5501	18135	1	-	-	-	-	-	-	-	-	-	55893
16	Emerald shiner	<i>Notropis atherinoides</i>	23	-	-	-	-	-	-	-	-	-	-	-	160
17	River shiner	<i>Notropis blennioides</i>	-	-	-	-	-	-	-	-	-	-	-	-	8
18	Bigmouth shiner	<i>Notropis dorsalis</i>	121	-	-	-	-	-	-	-	-	-	-	-	222
19	Spottail shiner	<i>Notropis hudsonius</i>	-	-	-	-	-	-	-	-	-	-	-	-	22
20	Sand shiner	<i>Notropis stramineus</i>	2	-	-	-	-	-	-	-	-	-	-	-	12
21	Weed shiner	<i>Notropis texanus</i>	-	-	-	-	-	-	-	-	-	-	-	-	7
22	Mimic shiner	<i>Notropis volucellus</i>	47	-	-	-	-	-	-	-	-	-	-	-	1136
23	Pugnose minnow	<i>Opsopoeodus emiliae</i>	20	-	-	-	-	-	-	-	-	-	-	-	74
24	Bluntnose minnow	<i>Pimephales notatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	12
25	Bullhead minnow	<i>Pimephales vigilax</i>	28	-	-	-	-	-	-	-	-	-	-	-	1443
26	Unidentified minnow	Unidentified Cyprinidae	-	-	-	-	-	-	-	-	-	-	-	-	2006
27	River carpsucker	<i>Carpoides carpio</i>	4	-	-	-	-	-	-	-	-	-	-	-	32
28	Quillback	<i>Carpoides cyprinus</i>	25	-	-	-	-	-	-	-	-	-	-	-	45
29	Unidentified carpsucker	<i>Carpoides sp.</i>	3	-	-	-	-	-	-	-	-	-	-	-	625
30	White sucker	<i>Catostomus commersoni</i>	30	-	2	1	1	-	-	-	-	-	-	-	10
31	Blue sucker	<i>Cyclopterus elongatus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
32	Northern hog sucker	<i>Hypentelium nigrikanus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
33	Smallmouth buffalo	<i>Ictiobus bubalus</i>	18	3	8	1	-	-	-	-	-	-	-	-	214
34	Bigmouth buffalo	<i>Ictiobus cyprinellus</i>	7	-	-	-	-	-	-	-	-	-	-	-	14
35	Black buffalo	<i>Ictiobus niger</i>	-	2	-	-	-	-	-	-	-	-	-	-	2
36	Spotted sucker	<i>Minytrema melanops</i>	68	-	3	11	1	-	-	-	-	-	-	-	84
37	Silver redhorse	<i>Moxostoma anisurum</i>	135	2	37	68	2	4	1	2	11	-	-	-	278
38	River redhorse	<i>Moxostoma carinatum</i>	58	-	-	-	-	-	-	-	-	-	-	-	60
39	Golden redhorse	<i>Moxostoma erythrurum</i>	37	-	-	-	-	-	-	-	-	-	-	-	51

Gears:

D = Day electrofishing

N = Night electrofishing

F = Fyke netting

X = Tandem fyke netting

M = Mini fyke netting

Y = Tandem mini fyke netting

S = Seining

HS = Small hoop netting

HL = Large hoop netting

G = Gill netting

TA = Trawl netting, anchored sets

T = Trawling (4.8-m bottom trawl)

Table 1.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 4 of the Mississippi River. See Table 1.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	254	41	20	42	2	1	2	3	9	18	-	-	392
41	Unidentified redhorse	<i>Moxostoma</i> sp.	39	-	-	-	10	8	125	-	-	-	-	-	182
42	Unidentified sucker	Unidentified Catostomidae	-	-	-	-	1	-	-	-	-	-	-	-	1
43	Black bullhead	<i>Ameiurus melas</i>	-	-	-	-	1	-	1	1	-	-	-	-	3
44	Yellow bullhead	<i>Ameiurus natalis</i>	9	5	6	-	1	4	-	1	1	-	-	-	7
45	Channel catfish	<i>Ictalurus punctatus</i>	1	-	-	-	3	3	-	-	39	17	-	-	155
46	Tadpole madtom	<i>Noturus gyrinus</i>	14	17	2	-	5	1	-	-	-	4	4	3	7
47	Flathead catfish	<i>Pylodictis olivaris</i>	35	13	9	6	1	5	-	2	6	3	-	-	52
48	Northern pike	<i>Esox lucius</i>	-	-	-	4	7	4	-	-	-	-	-	-	93
49	Trout perch	<i>Percopsis omiscomaycus</i>	-	-	-	-	4	7	-	-	-	-	-	-	15
50	Burbot	<i>Lota lota</i>	2	-	-	-	-	-	-	-	-	-	-	-	2
51	Brook silverside	<i>Labidesthes sicculus</i>	1	3	-	-	-	-	2	-	-	-	-	-	6
52	White bass	<i>Morone chrysops</i>	208	188	44	66	121	19	98	13	2	70	-	-	829
53	Rock bass	<i>Ambloplites rupestris</i>	95	-	19	54	20	5	17	29	-	-	-	-	239
54	Green sunfish	<i>Leponotus cyanellus</i>	19	20	-	-	1	1	-	1	-	-	-	-	41
55	Pumpkinseed	<i>Leponotus gibbosus</i>	9	-	1	30	5	2	-	-	-	-	-	-	47
56	Orangespotted sunfish	<i>Leponotus humilis</i>	-	-	1	-	-	-	-	-	-	-	-	-	1
57	Bluegill	<i>Leponotus macrochirus</i>	441	352	178	558	1134	76	29	23	1	-	-	-	2792
58	Green x bluegill sunfish	<i>L. cyanellus x macrochirus</i>	-	-	1	-	-	-	-	-	-	-	-	-	1
59	Pumpkinseed x bluegill	<i>L. gibbosus x macrochirus</i>	1	-	-	-	-	-	-	-	-	-	-	-	354
60	Smallmouth bass	<i>Micropterus dolomieu</i>	218	100	-	-	5	-	-	30	1	-	-	-	286
61	Largemouth bass	<i>Micropterus salmoides</i>	233	31	4	1	4	-	13	-	-	-	-	-	354
62	White crappie	<i>Pomoxis annularis</i>	7	18	11	26	11	12	1	2	-	1	-	-	89
63	Black crappie	<i>Pomoxis nigromaculatus</i>	42	40	214	510	26	23	10	6	24	1	-	-	89
64	Western sand darter	<i>Ammocrypta clara</i>	-	-	-	-	-	-	23	-	-	-	-	-	23
65	Mud darter	<i>Etheostoma asprigene</i>	-	-	-	-	3	1	2	-	-	-	-	-	6
66	Johnny darter	<i>Etheostoma nigrum</i>	15	-	-	-	14	8	66	-	-	-	-	-	103
67	Yellow perch	<i>Perca flavescens</i>	312	1	6	134	4	2	26	-	-	-	-	-	485
68	Logperch	<i>Perca caprodes</i>	124	21	-	-	10	1	38	-	-	-	-	-	194
69	Slenderhead darter	<i>Perca phoxocephala</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
70	River darter	<i>Perca shumardi</i>	2	2	-	-	16	2	19	-	-	-	-	-	41
71	Sauger	<i>Stizostedion canadense</i>	177	438	10	15	19	4	16	1	1	2	-	-	683
72	Walleye	<i>Stizostedion vitreum</i>	93	72	1	13	7	1	5	1	1	7	-	-	201
73	Sauger x walleye hybrid	<i>S. canadense x vitreum</i>	101	44	87	101	31	82	20	10	46	16	-	-	8
74	Freshwater drum	<i>Aplodinotus grunniens</i>	-	-	-	-	1	-	12	-	-	-	-	-	544
75	Larval fish	Unidentified	1	-	-	-	1	-	-	-	-	3	-	-	13
76	Unidentified	Unidentified	1	-	-	-	1	-	-	-	-	-	-	-	5
			10167	20224	787	1728	10063	973	29776	224	514	544	35	19	75054

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting
 T - Trawling (4.8-m bottom trawl)

Table 1.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	MCBW	SCB
Chestnut lamprey	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Silver lamprey	0.05 (0.03)	0.09 (0.06)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
American brook lamprey	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Longnose gar	0.07 (0.03)	0.04 (0.04)	0.08 (0.06)	0.00 (0.00)	0.08 (0.06)
Shortnose gar	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Bowfin	0.18 (0.09)	0.09 (0.06)	0.04 (0.04)	0.00 (0.00)	0.42 (0.28)
Mooneye	0.09 (0.06)	0.00 (0.00)	0.38 (0.24)	0.15 (0.15)	0.00 (0.00)
Gizzard shad	11.45 (4.74)	5.78 (2.44)	20.54 (15.39)	0.00 (0.00)	12.04 (8.21)
Spotfin shiner	1.17 (0.25)	0.52 (0.29)	0.98 (0.37)	0.00 (0.00)	2.21 (0.60)
Common carp	5.65 (0.86)	4.30 (1.30)	4.15 (0.80)	1.44 (0.82)	8.67 (1.98)
Silver chub	0.11 (0.05)	0.00 (0.00)	0.21 (0.17)	0.00 (0.00)	0.17 (0.10)
Golden shiner	0.10 (0.06)	0.17 (0.12)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Emerald shiner	65.26 (33.42)	5.48 (2.64)	82.70 (44.40)	11.24 (7.05)	132.08 (98.98)
River shiner	0.25 (0.12)	0.00 (0.00)	0.83 (0.49)	0.00 (0.00)	0.13 (0.09)
Spottail shiner	2.13 (1.80)	4.43 (4.21)	0.29 (0.17)	0.00 (0.00)	0.50 (0.25)
Sand shiner	0.02 (0.01)	0.00 (0.00)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)
Mimic shiner	0.47 (0.34)	0.00 (0.00)	1.89 (1.35)	0.00 (0.00)	0.00 (0.00)
Pugnose minnow	0.37 (0.21)	0.83 (0.48)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Bullhead minnow	0.39 (0.14)	0.35 (0.26)	0.29 (0.18)	0.00 (0.00)	0.54 (0.19)
River carpsucker	0.06 (0.04)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.08 (0.06)
Quillback	0.28 (0.07)	0.30 (0.12)	0.33 (0.18)	0.48 (0.48)	0.21 (0.10)
Unidentified carpsucker	0.05 (0.03)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
White sucker	0.05 (0.03)	0.09 (0.06)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Blue sucker	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.20 (0.07)	0.09 (0.06)	0.29 (0.13)	0.55 (0.43)	0.29 (0.18)
Bigmouth buffalo	0.08 (0.03)	0.04 (0.04)	0.13 (0.07)	0.00 (0.00)	0.08 (0.06)
Spotted sucker	1.21 (0.30)	2.52 (0.66)	0.00 (0.00)	0.00 (0.00)	0.42 (0.33)
Silver redhorse	1.77 (0.29)	1.87 (0.53)	1.25 (0.36)	2.24 (1.08)	2.04 (0.48)
River redhorse	0.24 (0.08)	0.04 (0.04)	0.50 (0.27)	6.27 (2.86)	0.25 (0.14)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MC BU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 1.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	MCBW	SCB
Golden redhorse	0.50 (0.13)	0.52 (0.24)	0.42 (0.16)	0.00 (0.00)	0.54 (0.22)
Shorthead redhorse	2.18 (0.28)	1.74 (0.40)	2.49 (0.59)	10.98 (4.79)	2.46 (0.50)
Unidentified redhorse	0.57 (0.29)	0.52 (0.35)	0.17 (0.17)	0.00 (0.00)	0.96 (0.77)
Channel catfish	0.12 (0.05)	0.09 (0.06)	0.00 (0.00)	0.12 (0.12)	0.25 (0.14)
Tadpole madtom	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Flathead catfish	0.10 (0.03)	0.04 (0.04)	0.04 (0.04)	0.00 (0.00)	0.21 (0.08)
Northern pike	0.49 (0.10)	0.61 (0.19)	0.33 (0.14)	0.12 (0.12)	0.46 (0.16)
Burbot	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.15 (0.15)	0.00 (0.00)
Brook silverside	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
White bass	2.14 (0.55)	0.67 (0.36)	2.29 (1.38)	1.40 (0.51)	4.00 (1.28)
Rock bass	1.33 (0.28)	1.13 (0.35)	1.08 (0.40)	0.00 (0.00)	1.79 (0.66)
Green sunfish	0.06 (0.03)	0.04 (0.04)	0.04 (0.04)	0.00 (0.00)	0.08 (0.06)
Pumpkinseed	0.16 (0.11)	0.30 (0.26)	0.00 (0.00)	0.00 (0.00)	0.08 (0.06)
Bluegill	6.69 (1.46)	9.71 (2.65)	1.25 (0.48)	0.00 (0.00)	6.96 (2.87)
Pumpkinseed x bluegill	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth bass	2.36 (0.48)	1.57 (0.84)	3.07 (0.57)	2.53 (1.76)	2.88 (0.91)
Largemouth bass	3.64 (0.60)	5.48 (1.23)	1.25 (0.60)	0.00 (0.00)	3.08 (0.81)
White crappie	0.10 (0.04)	0.15 (0.09)	0.00 (0.00)	0.00 (0.00)	0.13 (0.07)
Black crappie	0.65 (0.21)	0.87 (0.38)	0.17 (0.10)	0.00 (0.00)	0.75 (0.43)
Johnny darter	0.26 (0.14)	0.57 (0.32)	0.00 (0.00)	0.12 (0.12)	0.04 (0.04)
Yellow perch	4.93 (1.13)	7.26 (1.83)	1.46 (0.78)	0.00 (0.00)	4.58 (2.51)
Logperch	1.24 (0.34)	0.61 (0.27)	2.42 (1.19)	0.60 (0.60)	1.17 (0.39)
Sauger	2.10 (0.48)	1.80 (0.55)	1.67 (1.00)	0.00 (0.00)	2.88 (1.08)
Walleye	1.01 (0.20)	1.30 (0.39)	0.38 (0.25)	1.04 (0.57)	1.13 (0.32)
Sauger x walleye hybrid	0.04 (0.02)	0.04 (0.04)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	1.51 (0.38)	2.50 (0.84)	0.92 (0.44)	0.42 (0.28)	0.67 (0.17)
Unidentified	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 1.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBW
Shortnose gar	0.23 (0.18)	0.23 (0.18)	0.00 (0.00)
Bowfin	0.84 (0.42)	0.85 (0.42)	0.00 (0.00)
Mooneye	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
Gizzard shad	0.12 (0.08)	0.12 (0.08)	0.00 (0.00)
Common carp	3.60 (1.19)	3.63 (1.20)	0.00 (0.00)
Golden shiner	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
River carpsucker	0.11 (0.08)	0.11 (0.08)	0.00 (0.00)
Quillback	0.05 (0.05)	0.05 (0.05)	0.00 (0.00)
White sucker	0.11 (0.11)	0.11 (0.11)	0.00 (0.00)
Smallmouth buffalo	0.45 (0.39)	0.46 (0.40)	0.00 (0.00)
Spotted sucker	0.17 (0.09)	0.17 (0.09)	0.00 (0.00)
Silver redhorse	2.04 (0.65)	2.06 (0.66)	0.00 (0.00)
Shorthead redhorse	1.14 (0.48)	1.15 (0.48)	0.00 (0.00)
Yellow bullhead	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
Channel catfish	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
Flathead catfish	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
Northern pike	0.66 (0.23)	0.66 (0.23)	0.00 (0.00)
White bass	0.98 (0.44)	0.98 (0.44)	0.00 (0.00)
Rock bass	0.69 (0.38)	0.69 (0.38)	1.22 (1.03)
Pumpkinseed	0.05 (0.05)	0.05 (0.05)	0.00 (0.00)
Bluegill	7.37 (2.37)	7.41 (2.39)	1.05 (1.05)
Green x bluegill sunfish	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
Largemouth bass	0.21 (0.12)	0.21 (0.12)	0.00 (0.00)
White crappie	0.44 (0.26)	0.45 (0.26)	0.00 (0.00)
Black crappie	7.80 (2.65)	7.85 (2.67)	0.52 (0.36)
Yellow perch	0.33 (0.16)	0.33 (0.17)	0.00 (0.00)
Sauger	0.34 (0.16)	0.34 (0.17)	0.00 (0.00)
Walleye	0.06 (0.06)	0.06 (0.06)	0.00 (0.00)
Sauger x walleye hybrid	0.05 (0.05)	0.05 (0.05)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBW
Freshwater drum	1.02 (0.34)	1.02 (0.34)	0.17 (0.17)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO
Longnose gar	0.03 (0.02)	0.03 (0.02)
Shortnose gar	0.28 (0.26)	0.28 (0.26)
Bowfin	0.32 (0.15)	0.32 (0.15)
Mooneye	0.02 (0.02)	0.02 (0.02)
Gizzard shad	0.26 (0.09)	0.26 (0.09)
Common carp	0.43 (0.19)	0.43 (0.19)
River carpsucker	0.05 (0.05)	0.05 (0.05)
Quillback	0.04 (0.03)	0.04 (0.04)
White sucker	0.02 (0.02)	0.02 (0.02)
Smallmouth buffalo	0.02 (0.02)	0.02 (0.02)
Spotted sucker	0.19 (0.18)	0.19 (0.18)
Silver redhorse	1.19 (0.33)	1.19 (0.33)
Golden redhorse	0.03 (0.02)	0.03 (0.02)
Shorthead redhorse	0.74 (0.23)	0.74 (0.23)
Flathead catfish	0.04 (0.02)	0.04 (0.02)
Northern pike	0.16 (0.06)	0.16 (0.06)
White bass	1.17 (0.31)	1.17 (0.32)
Rock bass	0.97 (0.35)	0.97 (0.35)
Pumpkinseed	0.49 (0.32)	0.49 (0.32)
Orangespotted sunfish	0.02 (0.02)	0.02 (0.02)
Bluegill	9.41 (3.01)	9.41 (3.02)
Largemouth bass	0.02 (0.02)	0.02 (0.02)
White crappie	0.47 (0.26)	0.47 (0.26)
Black crappie	8.83 (1.82)	8.83 (1.83)
Yellow perch	2.27 (0.78)	2.27 (0.78)
Sauger	0.27 (0.07)	0.27 (0.07)
Walleye	0.23 (0.07)	0.23 (0.07)
Freshwater drum	1.80 (0.47)	1.80 (0.47)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	MCBW	SCB
Longnose gar	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Shortnose gar	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Bowfin	0.03 (0.03)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	0.64 (0.45)	1.26 (1.02)	0.00 (0.00)	0.00 (0.00)	0.31 (0.31)
Spotfin shiner	1.35 (0.40)	0.29 (0.23)	1.75 (0.82)	0.17 (0.17)	2.46 (1.03)
Common carp	0.18 (0.09)	0.06 (0.06)	0.09 (0.09)	0.00 (0.00)	0.42 (0.27)
Emerald shiner	19.37 (13.53)	37.45 (31.54)	7.26 (4.65)	0.00 (0.00)	4.84 (2.68)
River shiner	0.36 (0.28)	0.00 (0.00)	1.08 (1.08)	0.00 (0.00)	0.27 (0.27)
Spottail shiner	0.98 (0.77)	0.29 (0.14)	3.14 (3.05)	0.00 (0.00)	0.23 (0.23)
Weed shiner	0.02 (0.02)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Mimic shiner	2.23 (1.46)	0.52 (0.36)	2.52 (2.43)	0.00 (0.00)	4.32 (4.13)
Pugnose minnow	0.75 (0.55)	0.27 (0.19)	0.18 (0.18)	0.00 (0.00)	1.82 (1.71)
Bullhead minnow	8.88 (7.02)	2.64 (2.18)	1.10 (1.01)	0.00 (0.00)	23.38 (21.81)
Unidentified carpsucker	0.12 (0.12)	0.00 (0.00)	0.50 (0.50)	0.00 (0.00)	0.00 (0.00)
White sucker	0.03 (0.03)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Spotted sucker	0.03 (0.02)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Silver redhorse	0.05 (0.03)	0.06 (0.06)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
Shorthead redhorse	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Unidentified redhorse	0.21 (0.13)	0.06 (0.06)	0.66 (0.51)	0.00 (0.00)	0.06 (0.06)
Unidentified sucker	0.02 (0.02)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Black bullhead	0.02 (0.02)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
Tadpole madtom	0.06 (0.04)	0.06 (0.06)	0.08 (0.08)	0.00 (0.00)	0.06 (0.06)
Flathead catfish	0.07 (0.04)	0.13 (0.09)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Northern pike	0.12 (0.07)	0.00 (0.00)	0.34 (0.26)	0.00 (0.00)	0.11 (0.08)
Trout perch	0.08 (0.05)	0.00 (0.00)	0.18 (0.12)	0.00 (0.00)	0.12 (0.12)
White bass	2.20 (1.49)	0.56 (0.40)	6.40 (5.89)	0.00 (0.00)	1.15 (0.70)
Rock bass	0.40 (0.17)	0.00 (0.00)	0.60 (0.20)	0.00 (0.00)	0.77 (0.51)
Green sunfish	0.02 (0.02)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Pumpkinseed	0.11 (0.11)	0.26 (0.26)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 1.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	MCBW	SCB
Bluegill	26.97 (20.24)	60.86 (47.43)	2.40 (1.70)	0.00 (0.00)	1.09 (0.66)
Smallmouth bass	0.10 (0.05)	0.05 (0.05)	0.24 (0.17)	0.00 (0.00)	0.06 (0.06)
Largemouth bass	0.08 (0.04)	0.05 (0.05)	0.18 (0.12)	0.00 (0.00)	0.05 (0.05)
White crappie	0.27 (0.14)	0.59 (0.33)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Black crappie	0.48 (0.14)	0.55 (0.28)	0.35 (0.20)	0.00 (0.00)	0.51 (0.21)
Mud darter	0.07 (0.05)	0.06 (0.06)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)
Johnny darter	0.32 (0.09)	0.36 (0.15)	0.42 (0.19)	0.00 (0.00)	0.17 (0.12)
Yellow perch	0.06 (0.04)	0.00 (0.00)	0.25 (0.18)	0.00 (0.00)	0.00 (0.00)
Logperch	0.19 (0.07)	0.30 (0.14)	0.16 (0.11)	0.00 (0.00)	0.06 (0.06)
River darter	0.12 (0.06)	0.06 (0.06)	0.08 (0.08)	0.00 (0.00)	0.24 (0.16)
Sauger	0.23 (0.12)	0.06 (0.06)	0.51 (0.42)	0.33 (0.33)	0.24 (0.14)
Walleye	0.15 (0.07)	0.06 (0.06)	0.25 (0.25)	0.00 (0.00)	0.18 (0.10)
Freshwater drum	0.11 (0.05)	0.12 (0.08)	0.00 (0.00)	0.00 (0.00)	0.17 (0.12)
Larval fish	0.03 (0.03)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Unidentified	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 1.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO
Bowfin	0.02 (0.02)	0.02 (0.02)
Gizzard shad	0.35 (0.21)	0.35 (0.21)
Spotfin shiner	0.02 (0.02)	0.02 (0.02)
Common carp	0.18 (0.09)	0.18 (0.09)
Emerald shiner	10.77 (6.74)	10.77 (6.76)
Spottail shiner	0.14 (0.05)	0.14 (0.05)
Mimic shiner	0.12 (0.11)	0.12 (0.11)
Pugnose minnow	0.28 (0.16)	0.28 (0.16)
Bullhead minnow	0.30 (0.10)	0.30 (0.10)
Unidentified minnow	0.09 (0.09)	0.09 (0.09)
River carpsucker	0.02 (0.02)	0.02 (0.02)
Spotted sucker	0.02 (0.02)	0.02 (0.02)
Silver redhorse	0.07 (0.03)	0.07 (0.03)
Shorthead redhorse	0.02 (0.02)	0.02 (0.02)
Unidentified redhorse	0.13 (0.12)	0.13 (0.12)
Channel catfish	0.07 (0.07)	0.07 (0.07)
Tadpole madtom	0.05 (0.03)	0.05 (0.03)
Flathead catfish	0.02 (0.02)	0.02 (0.02)
Northern pike	0.02 (0.02)	0.02 (0.02)
Trout perch	0.12 (0.06)	0.12 (0.06)
White bass	0.33 (0.11)	0.33 (0.11)
Rock bass	0.09 (0.05)	0.09 (0.05)
Pumpkinseed	0.03 (0.03)	0.03 (0.03)
Bluegill	1.36 (0.42)	1.36 (0.42)
White crappie	0.21 (0.13)	0.21 (0.13)
Black crappie	0.40 (0.14)	0.40 (0.14)
Mud darter	0.02 (0.02)	0.02 (0.02)
Johnny darter	0.14 (0.08)	0.14 (0.08)
Yellow perch	0.03 (0.02)	0.03 (0.02)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCO
Logperch	0.02 (0.02)	0.02 (0.02)
River darter	0.03 (0.02)	0.03 (0.02)
Sauger	0.07 (0.04)	0.07 (0.04)
Walleye	0.02 (0.02)	0.02 (0.02)
Freshwater drum	1.46 (0.53)	1.46 (0.53)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	MCBW	SCB
Common carp	0.16 (0.11)	0.23 (0.23)	0.00 (0.00)	0.11 (0.09)
Smallmouth buffalo	0.05 (0.03)	0.00 (0.00)	0.08 (0.08)	0.09 (0.06)
Silver redhorse	0.04 (0.03)	0.09 (0.06)	0.00 (0.00)	0.00 (0.00)
Shorthead redhorse	0.03 (0.02)	0.00 (0.00)	0.09 (0.09)	0.06 (0.04)
Yellow bullhead	0.02 (0.02)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.98 (0.38)	0.52 (0.43)	0.16 (0.10)	1.36 (0.59)
Rock bass	0.46 (0.28)	0.19 (0.15)	0.09 (0.09)	0.67 (0.50)
Bluegill	0.37 (0.19)	0.14 (0.10)	0.00 (0.00)	0.55 (0.33)
Smallmouth bass	0.02 (0.02)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Black crappie	0.04 (0.03)	0.05 (0.05)	0.00 (0.00)	0.03 (0.03)
Sauger	0.02 (0.02)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Walleye	0.02 (0.02)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	0.13 (0.07)	0.05 (0.05)	0.00 (0.00)	0.20 (0.12)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	MCBW	SCB
Longnose gar	0.03 (0.03)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Mooneye	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Common carp	1.48 (0.94)	1.55 (1.50)	0.00 (0.00)	1.44 (1.21)
River carpsucker	0.04 (0.04)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	1.91 (0.58)	1.49 (0.76)	1.15 (0.31)	2.24 (0.85)
Bigmouth buffalo	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Silver redhorse	0.18 (0.08)	0.12 (0.06)	0.00 (0.00)	0.23 (0.13)
Golden redhorse	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Shorthead redhorse	0.16 (0.06)	0.21 (0.11)	0.00 (0.00)	0.12 (0.07)
Channel catfish	0.53 (0.21)	0.42 (0.14)	0.00 (0.00)	0.61 (0.36)
Flathead catfish	0.04 (0.02)	0.04 (0.04)	0.00 (0.00)	0.03 (0.03)
Northern pike	0.04 (0.04)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
White bass	0.03 (0.02)	0.00 (0.00)	0.00 (0.00)	0.06 (0.04)
Bluegill	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Black crappie	0.28 (0.14)	0.40 (0.28)	0.68 (0.37)	0.17 (0.13)
Sauger	0.00 (0.00)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)
Walleye	0.02 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	0.40 (0.15)	0.59 (0.28)	0.08 (0.08)	0.26 (0.15)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	SCB
Longnose gar	0.02 (0.02)	0.06 (0.04)	0.00 (0.00)
Gizzard shad	2.11 (0.85)	0.75 (0.47)	3.17 (1.47)
Spotfin shiner	30.33 (8.46)	25.28 (11.64)	34.28 (12.14)
Common carp	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Speckled chub	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Silver chub	0.08 (0.05)	0.08 (0.06)	0.08 (0.08)
Emerald shiner	345.42 (114.02)	252.53 (129.50)	417.89 (177.61)
River shiner	1.53 (0.46)	2.64 (0.98)	0.67 (0.29)
Bigmouth shiner	0.12 (0.10)	0.06 (0.06)	0.17 (0.17)
Spottail shiner	0.66 (0.35)	0.50 (0.40)	0.78 (0.54)
Sand shiner	0.13 (0.06)	0.25 (0.13)	0.03 (0.03)
Weed shiner	0.12 (0.11)	0.28 (0.25)	0.00 (0.00)
Mimic shiner	11.42 (6.50)	20.36 (14.77)	4.44 (1.79)
Bluntnose minnow	0.15 (0.13)	0.31 (0.31)	0.03 (0.03)
Bullhead minnow	12.82 (3.76)	4.61 (2.63)	19.22 (6.42)
Unidentified minnow	3.13 (1.86)	0.03 (0.03)	5.56 (3.33)
Quillback	0.09 (0.08)	0.03 (0.03)	0.14 (0.14)
Unidentified carpsucker	9.60 (5.56)	0.14 (0.09)	16.97 (9.96)
Northern hog sucker	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
River redhorse	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Shorthead redhorse	0.03 (0.03)	0.00 (0.00)	0.06 (0.06)
Unidentified redhorse	1.61 (0.83)	2.75 (1.84)	0.72 (0.38)
Yellow bullhead	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)
Northern pike	0.07 (0.05)	0.03 (0.03)	0.11 (0.09)
Trout perch	0.05 (0.04)	0.11 (0.09)	0.00 (0.00)
Brook silverside	0.03 (0.02)	0.00 (0.00)	0.06 (0.04)
White bass	1.36 (0.54)	1.36 (0.70)	1.36 (0.80)
Rock bass	0.24 (0.10)	0.17 (0.10)	0.31 (0.16)
Green sunfish	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 1.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	MCBU	SCB
Bluegill	0.43 (0.19)	0.22 (0.14)	0.58 (0.33)
Smallmouth bass	0.43 (0.11)	0.31 (0.11)	0.53 (0.17)
Largemouth bass	0.20 (0.12)	0.00 (0.00)	0.36 (0.21)
White crappie	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)
Black crappie	0.16 (0.12)	0.00 (0.00)	0.28 (0.21)
Western sand darter	0.28 (0.13)	0.64 (0.29)	0.00 (0.00)
Mud darter	0.03 (0.02)	0.00 (0.00)	0.06 (0.04)
Johnny darter	0.87 (0.24)	1.31 (0.49)	0.53 (0.18)
Yellow perch	0.37 (0.18)	0.31 (0.16)	0.42 (0.29)
Logperch	0.49 (0.16)	0.83 (0.36)	0.22 (0.10)
River darter	0.26 (0.14)	0.28 (0.14)	0.25 (0.22)
Sauger	0.24 (0.10)	0.08 (0.05)	0.36 (0.18)
Walleye	0.07 (0.03)	0.08 (0.05)	0.06 (0.04)
Freshwater drum	0.27 (0.12)	0.33 (0.22)	0.22 (0.13)
Larval fish	0.18 (0.16)	0.06 (0.06)	0.28 (0.28)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWC0 - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO
Longnose gar	0.18 (0.12)	0.18 (0.12)
Bowfin	0.67 (0.26)	0.67 (0.26)
Mooneye	0.08 (0.08)	0.08 (0.08)
Gizzard shad	18.79 (9.46)	18.79 (9.47)
Common carp	6.88 (1.83)	6.88 (1.83)
River carpsucker	1.55 (0.87)	1.55 (0.87)
Quillback	0.93 (0.45)	0.93 (0.45)
White sucker	0.26 (0.19)	0.26 (0.19)
Smallmouth buffalo	3.20 (1.14)	3.20 (1.14)
Bigmouth buffalo	0.17 (0.12)	0.17 (0.12)
Silver redhorse	1.46 (0.53)	1.46 (0.53)
River redhorse	0.09 (0.09)	0.09 (0.09)
Golden redhorse	0.75 (0.48)	0.75 (0.48)
Shorthead redhorse	1.51 (0.71)	1.51 (0.71)
Channel catfish	1.43 (0.28)	1.43 (0.28)
Flathead catfish	0.34 (0.19)	0.34 (0.19)
Northern pike	0.52 (0.20)	0.52 (0.20)
White bass	5.94 (2.62)	5.94 (2.62)
White crappie	0.09 (0.09)	0.09 (0.09)
Black crappie	0.09 (0.09)	0.09 (0.09)
Walleye	0.59 (0.29)	0.59 (0.29)
Sauger x walleye hybrid	0.09 (0.09)	0.09 (0.09)
Freshwater drum	1.36 (0.70)	1.36 (0.70)
Unidentified	0.23 (0.23)	0.23 (0.23)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.3.10. Mean catch-per-unit-effort and (standard error) for fishes collected by using anchored trammel netting in Pool 4 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 1.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO
Common carp	1.28 (0.31)	1.28 (0.31)
River carpsucker	0.19 (0.13)	0.19 (0.13)
Smallmouth buffalo	0.74 (0.50)	0.74 (0.50)
Bigmouth buffalo	0.40 (0.22)	0.40 (0.22)
Flathead catfish	0.31 (0.16)	0.31 (0.16)
Northern pike	0.31 (0.16)	0.31 (0.16)
Sauger	0.21 (0.14)	0.21 (0.14)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBW
Gizzard shad	35.14 (9.53)
Spotfin shiner	2.83 (2.83)
Common carp	7.15 (4.12)
Silver chub	0.20 (0.20)
Emerald shiner	47.74 (27.59)
Mimic shiner	0.37 (0.37)
Quillback	0.37 (0.37)
Bigmouth buffalo	0.37 (0.37)
Golden redhorse	0.39 (0.39)
Shorthead redhorse	5.48 (2.46)
Flathead catfish	2.81 (1.79)
Northern pike	0.20 (0.20)
Burbot	0.37 (0.37)
White bass	10.50 (2.83)
Green sunfish	6.31 (3.93)
Bluegill	6.37 (2.49)
Smallmouth bass	6.50 (2.38)
Largemouth bass	0.87 (0.50)
White crappie	0.20 (0.20)
Logperch	8.27 (5.39)
Slenderhead darter	0.47 (0.47)
River darter	0.75 (0.75)
Sauger	10.38 (4.69)
Walleye	6.60 (4.94)
Freshwater drum	2.81 (2.55)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	TWZ
Sauger	40.22 (16.20)
Walleye	6.79 (1.58)
Sauger x walleye hybrid	0.27 (0.19)
Freshwater drum	4.00 (1.31)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
BWCO - Backwater, contiguous, offshore SCB - Side channel border
IMPS - Impounded, shoreline TRI - Tributary mouth
IMPO - Impounded, offshore TWZ - Tailwater
MCBU - Main channel border, unstructured

Table 1.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBW	TWZ
Longnose gar	0.00 (0.00)	0.88 (0.88)
Shortnose gar	0.00 (0.00)	1.11 (0.85)
Bowfin	0.17 (0.17)	0.23 (0.23)
Gizzard shad	0.35 (0.35)	0.00 (0.00)
Common carp	1.09 (0.90)	1.67 (1.05)
Silver chub	0.17 (0.17)	0.00 (0.00)
Silver redhorse	0.00 (0.00)	0.23 (0.23)
Channel catfish	0.91 (0.55)	0.00 (0.00)
Flathead catfish	0.17 (0.17)	0.00 (0.00)
Northern pike	0.18 (0.18)	0.00 (0.00)
White bass	1.82 (1.62)	3.80 (2.34)
Bluegill	7.25 (5.75)	0.22 (0.22)
White crappie	0.55 (0.38)	0.00 (0.00)
Black crappie	10.90 (8.08)	1.79 (0.92)
Sauger	0.73 (0.37)	0.00 (0.00)
Freshwater drum	7.79 (3.57)	4.71 (2.81)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBW	TWZ
Gizzard shad	0.36 (0.23)	0.00 (0.00)
Spotfin shiner	0.00 (0.00)	4.58 (2.98)
Speckled chub	18.16 (16.81)	0.52 (0.52)
Silver chub	0.19 (0.19)	0.51 (0.51)
Emerald shiner	37.18 (16.20)	1123.59 (976.25)
Spottail shiner	0.00 (0.00)	0.18 (0.18)
Mimic shiner	0.19 (0.19)	12.40 (5.62)
Bullhead minnow	1.63 (1.04)	13.00 (11.94)
Shorthead redhorse	0.00 (0.00)	0.17 (0.17)
Channel catfish	0.19 (0.19)	0.00 (0.00)
Flathead catfish	0.00 (0.00)	0.35 (0.22)
White bass	0.34 (0.22)	2.26 (1.50)
Bluegill	0.70 (0.34)	0.54 (0.37)
White crappie	0.00 (0.00)	0.18 (0.18)
Black crappie	0.35 (0.35)	0.17 (0.17)
Yellow perch	0.00 (0.00)	0.19 (0.19)
Logperch	0.17 (0.17)	0.18 (0.18)
River darter	0.91 (0.61)	0.85 (0.66)
Sauger	0.00 (0.00)	1.03 (1.03)
Freshwater drum	1.11 (0.73)	3.43 (3.24)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 1.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBW	TWZ
Common carp	1.07 (0.43)	3.07 (1.18)
Smallmouth buffalo	0.08 (0.08)	0.08 (0.08)
Channel catfish	0.51 (0.41)	0.00 (0.00)
White bass	1.02 (1.02)	0.00 (0.00)
White crappie	0.08 (0.08)	0.08 (0.08)
Black crappie	0.32 (0.16)	0.00 (0.00)
Freshwater drum	0.08 (0.08)	0.08 (0.08)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.4.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBW	TWZ
Shovelnose sturgeon	0.09 (0.09)	0.00 (0.00)
Common carp	1.36 (1.26)	13.38 (8.64)
Smallmouth buffalo	0.09 (0.09)	0.20 (0.20)
Channel catfish	0.51 (0.51)	0.21 (0.21)
Flathead catfish	0.17 (0.11)	0.00 (0.00)
Freshwater drum	1.62 (1.42)	0.31 (0.20)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 1.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 4 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Shovelnose sturgeon	0.50 (0.17)
Speckled chub	0.10 (0.10)
Channel catfish	0.70 (0.50)
Freshwater drum	0.60 (0.50)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
BWCO - Backwater, contiguous, offshore SCB - Side channel border
IMPS - Impounded, shoreline TRI - Tributary mouth
IMPO - Impounded, offshore TWZ - Tailwater
MCBU - Main channel border, unstructured

Gizzard shad Electrofishing n= 1586

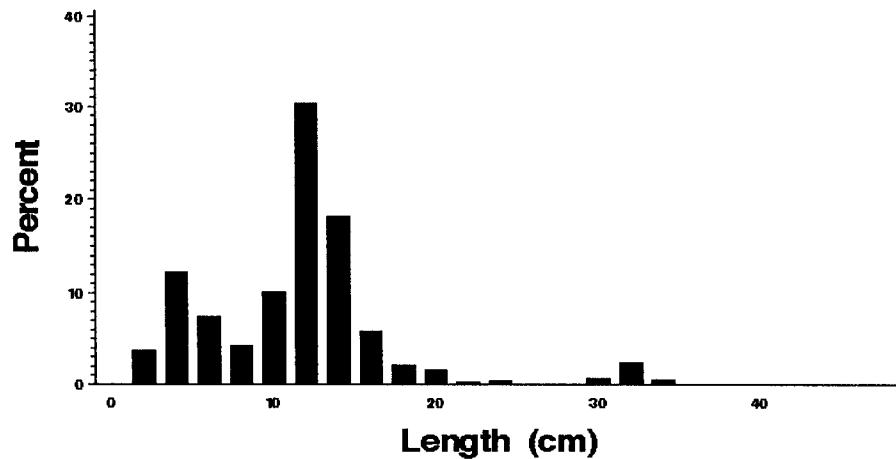


Figure 1.2. Length distributions (length) as a percentage of catch (percent) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

Common carp Electrofishing n= 540

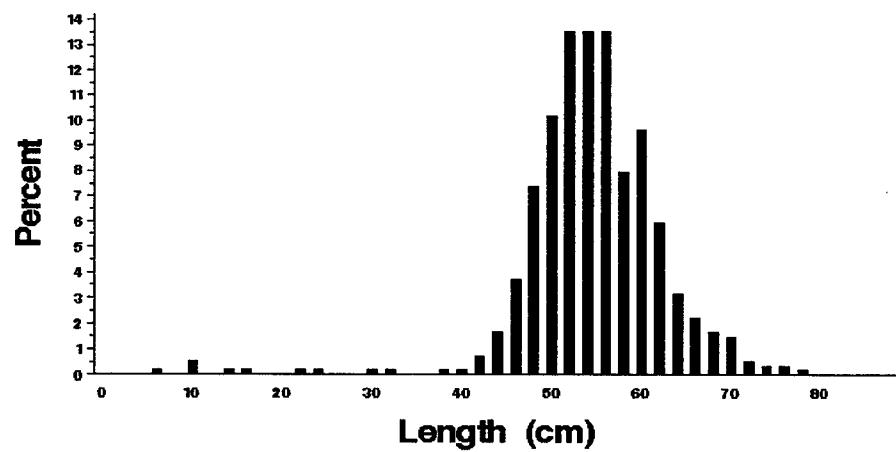


Figure 1.3. Length distributions (length) as a percentage of catch (percent) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

Smallmouth buffalo Electrofishing n=21

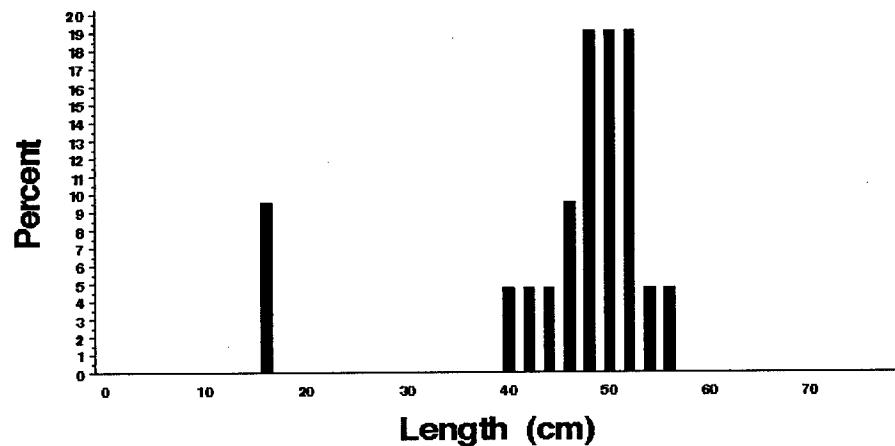


Figure 1.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

Smallmouth buffalo Hoop nets n= 139

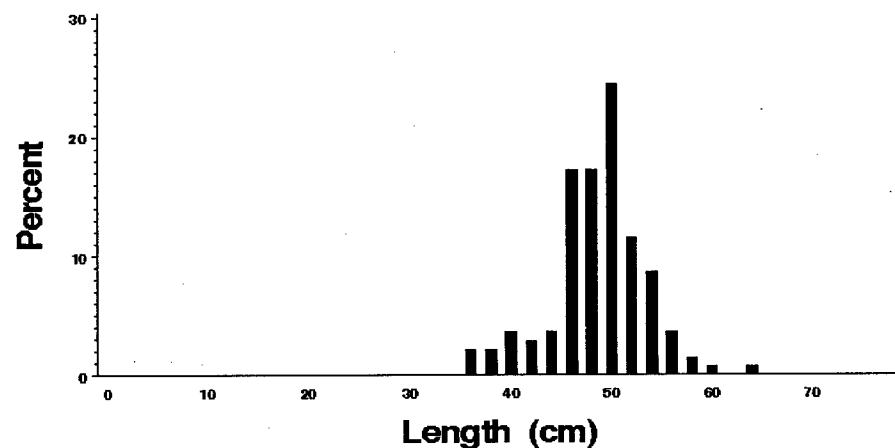


Figure 1.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by small and large hoop netting in Upper Mississippi River Pool 4 during 1998.

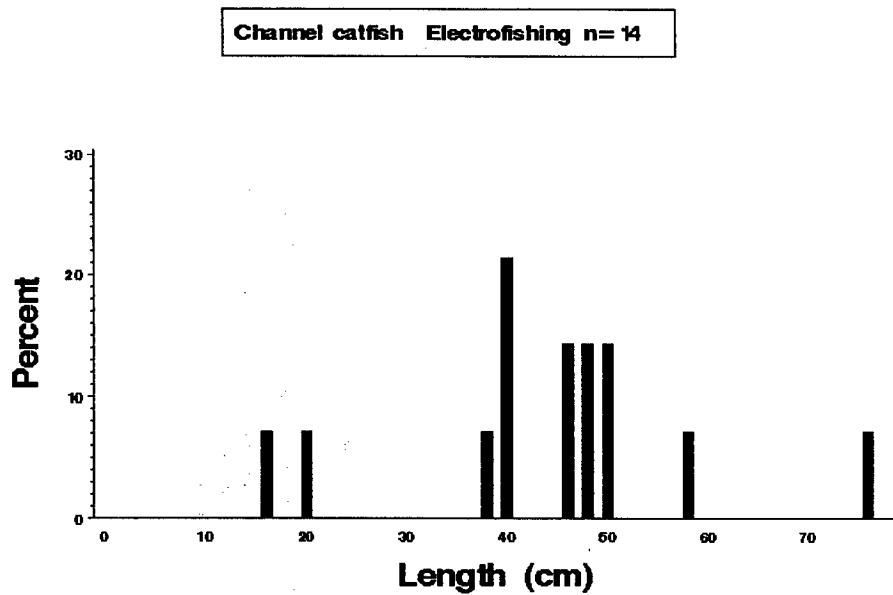


Figure 1.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

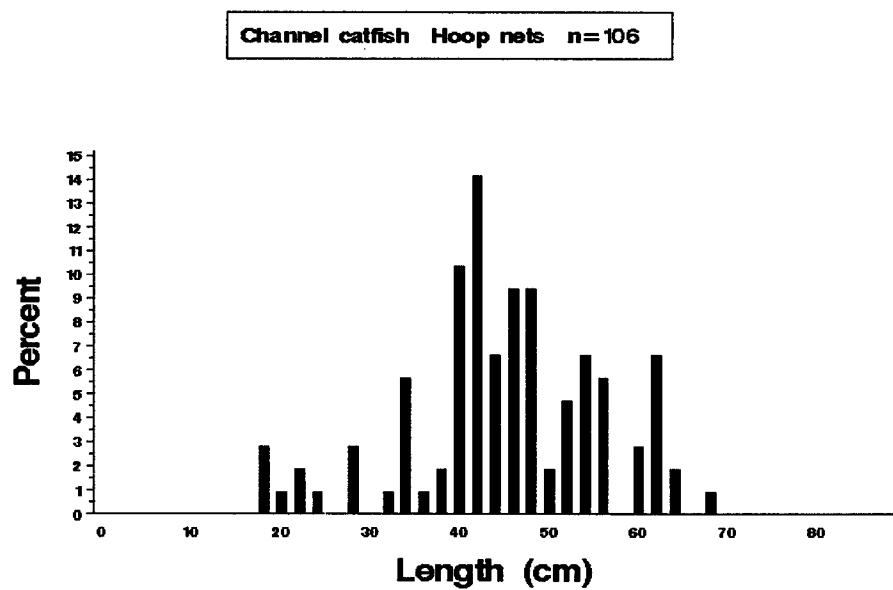


Figure 1.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by small and large hoop netting in Upper Mississippi River Pool 4 during 1998.

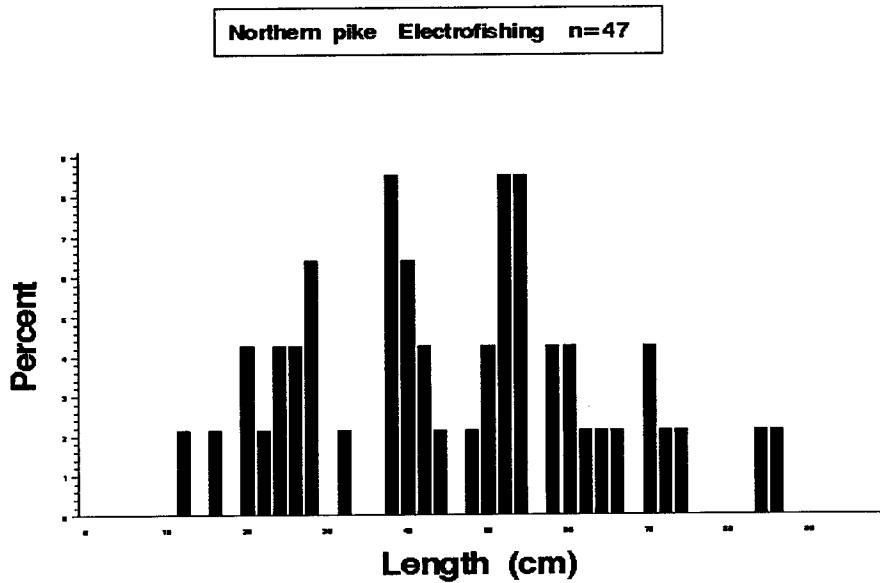


Figure 1.8. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

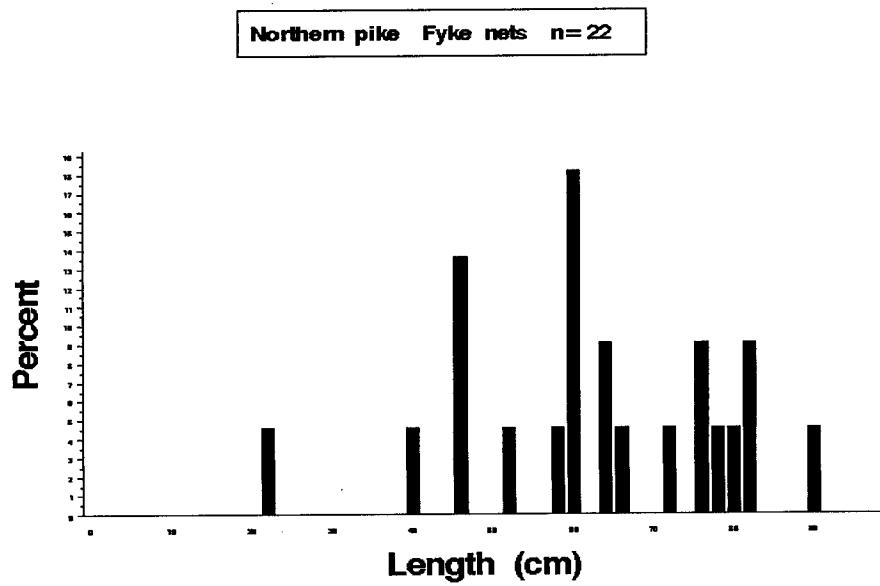


Figure 1.9. Length distributions (*length*) as a percentage of catch (*percent*) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 4 during 1998.

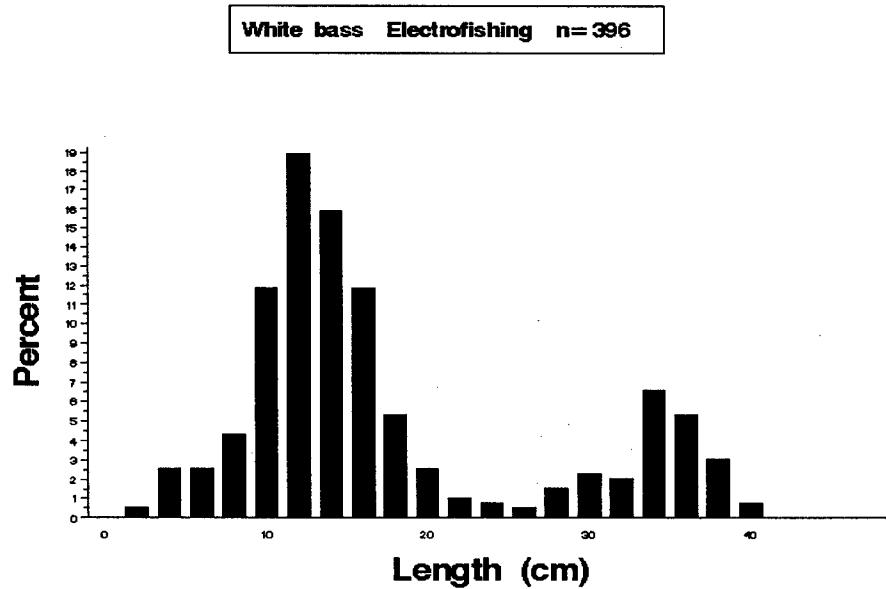


Figure 1.10. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

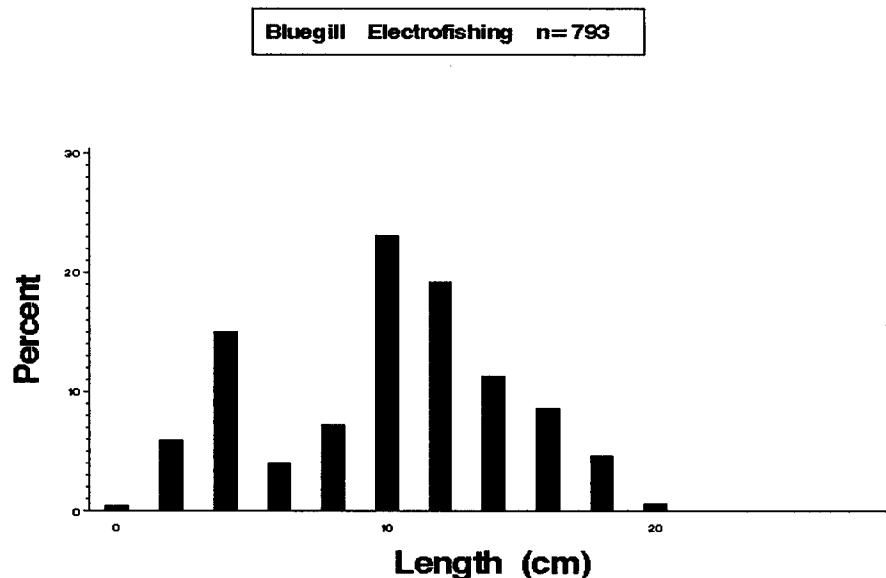


Figure 1.11. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

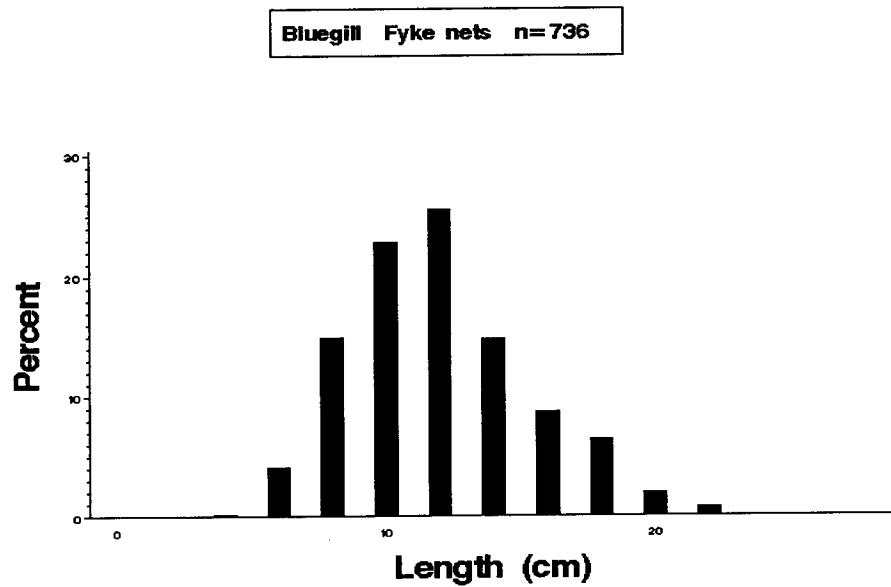


Figure 1.12. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 4 during 1998.

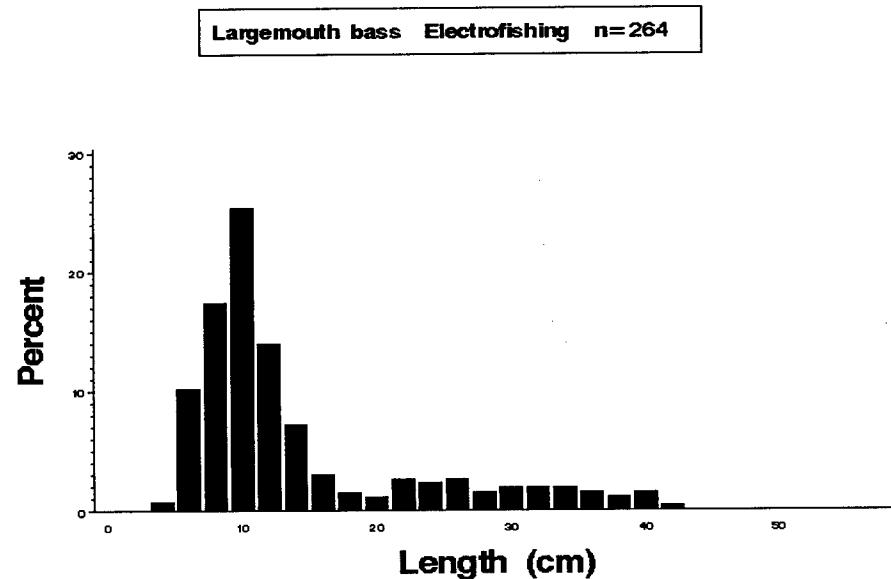


Figure 1.13. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

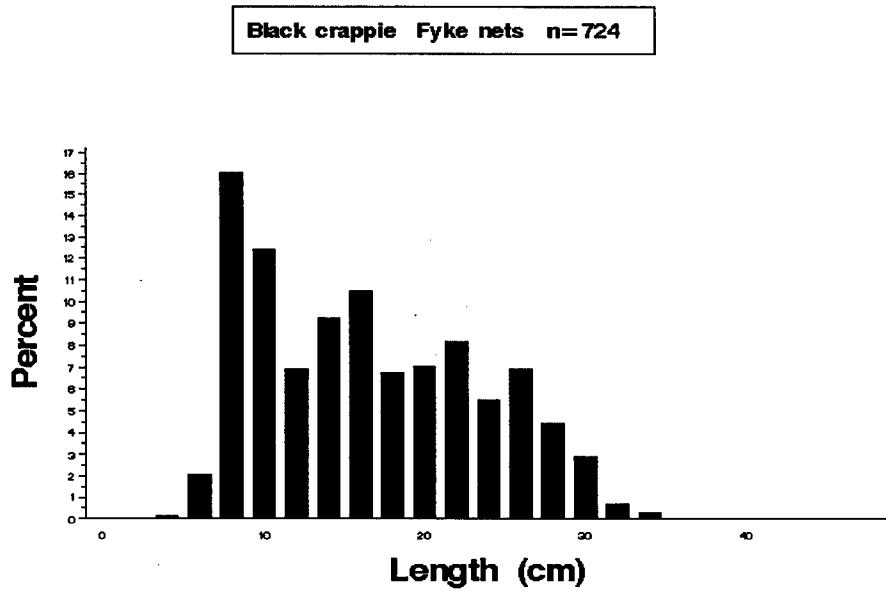


Figure 1.14. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

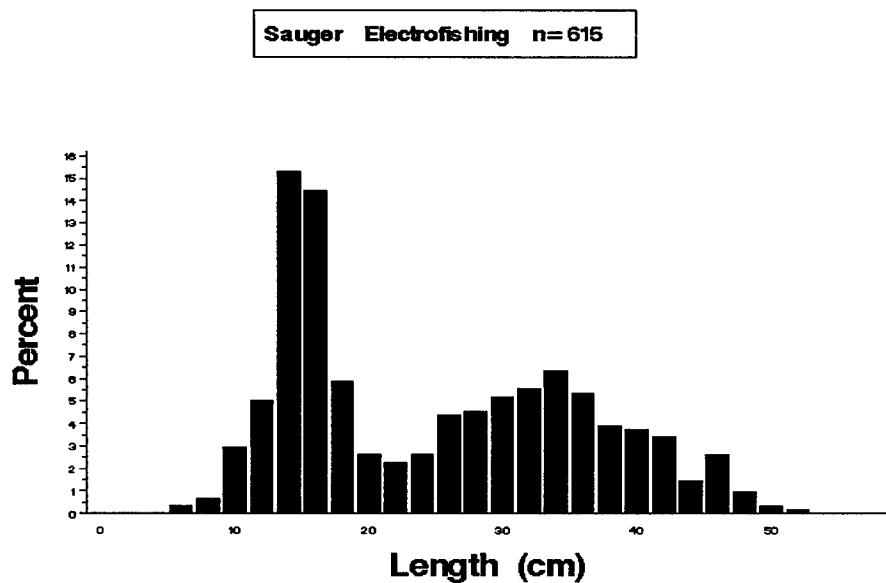


Figure 1.15. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

Walleye Electrofishing n= 165

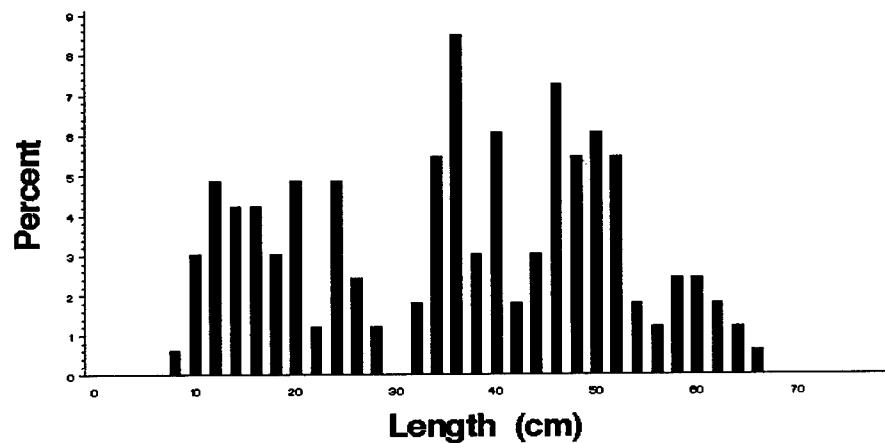


Figure 1.16. Length distributions (length) as a percentage of catch (percent) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

Freshwater drum Electrofishing n= 145

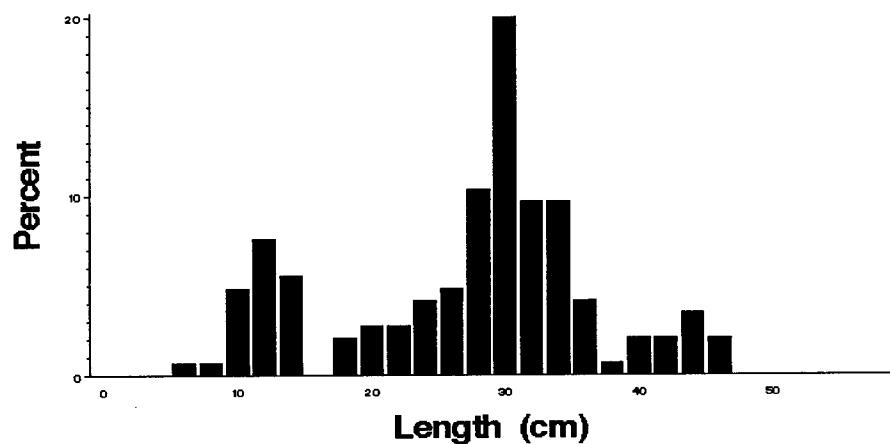


Figure 1.17. Length distributions (length) as a percentage of catch (percent) for freshwater drum (*Aplochiton grunniens*) collected by electrofishing in Upper Mississippi River Pool 4 during 1998.

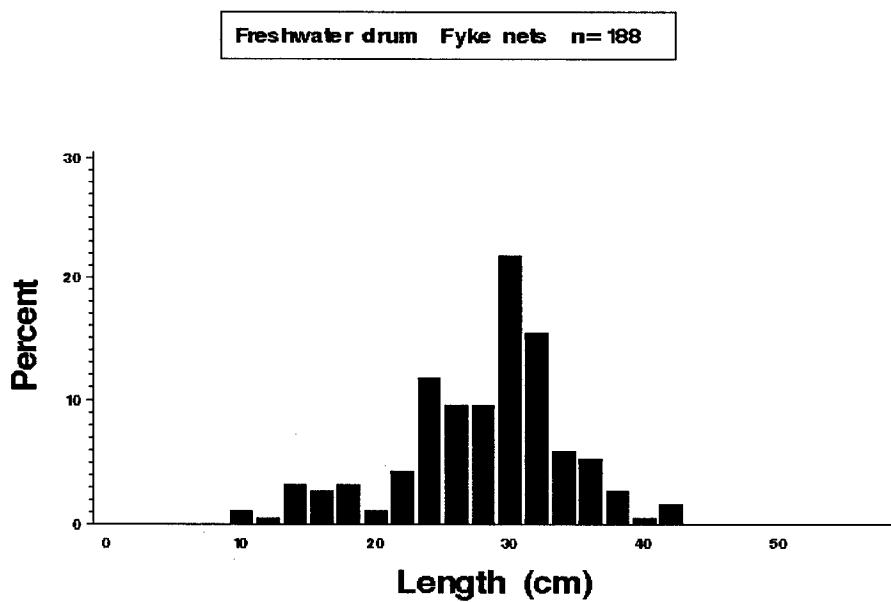


Figure 1.18. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplochiton grunniens*) collected by fyke netting in Upper Mississippi River Pool 4 during 1998.

Chapter 2. Pool 8, Upper Mississippi River

by

Eric Kramer and Andrew Bartels

Wisconsin Department of Natural Resources
LTRMP Pool 8 Field Station
575 Lester Avenue
Onalaska, Wisconsin 54650

Hydrograph

The 1998 hydrograph for Pool 8 (Figure 2.1) featured both above and below normal water levels from a period beginning in early March and continuing through mid-July. Spring flooding peaked in mid-April and the river also crested above flood stage in July. Between the two crests was a 2-month period of relatively low water where elevations were consistently 2-feet below the postimpoundment mean. Elevations for the remainder of the year followed the 57-year mean closely. Sampling activities were not adversely effected by water elevations in 1998. The discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

Summary of Sampling Effort

A total of 551 fish collections were made in Pool 8 during 1998. Gear allocations among strata remained nearly consistent for all three sampling periods, although one large hoop net collection was lost because of high current velocities during period one (Table 2.1). Of the total number of collections,

461 were from randomly selected sites in the BWC0, BWCS, IMPO, IMPS, MCBU, MCBW, and SCB strata. Fifty-four collections were made at fixed TWZ sites, and 36 were from two fixed backwater sites. Backwaters, followed by SCB and MCBU, received the most sampling effort.

Total Catch by Gear

A total of 69,484 fish were collected representing 75 species and 6 hybrids in 1998 (Table 2.2). This total does not include 2,236 fish <30 mm long identified only to family or genus. The five most abundant species in our samples were emerald shiner (13,466), bluegill (9,172), mimic shiner (8,215), spotfin shiner (7,051), and river shiner (3,230). Total species (excluding hybrids) collected by gear type were day electrofishing (66), night electrofishing (62), fyke netting (34), tandem fyke netting (31), mini fyke netting (58), tandem mini fyke netting (42), seining (44), small hoop netting (18), large hoop netting (29), and trawling (8). Fish distribution records for the Upper Mississippi River (Pitlo et al. 1995) document 99 fish species from Pool 8. Our species total before the 1998 season was 91; no new species were added to this total during

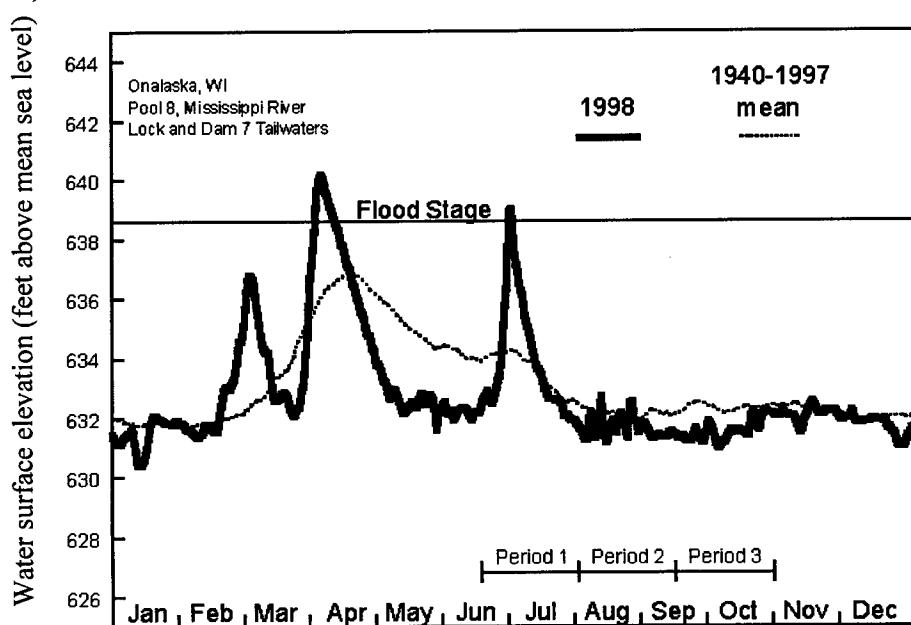


Figure 2.1. Daily water surface elevation from Lock and Dam 3 for Pool 8, Upper Mississippi River, during 1998 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

1998. Recent taxonomic work has suggested that no channel shiners exist in this reach of the Mississippi River and therefore our cumulative species total now stands at 90, as all channel shiners were reclassified as mimic shiners. Crystal darter and goldeye (one of each species) were the two Wisconsin listed endangered species that were caught in 1998. Fourteen blue suckers and 66 river redhorse were also collected, which are both threatened in Wisconsin.

Random Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 2.3.1), emerald shiner had the highest reachwide mean catch-per-unit effort (C/f , 45.60), followed by bluegill (25.32) and mimic shiner (17.53). Following are the fish species with the highest C/f within each stratum: emerald shiner (103.58, BWCS), common carp (10.58, IMPS), emerald shiner (29.67, MCBU), shorthead redhorse (11.86, MCBW), and bluegill (15.71, SCB).

Night Electrofishing

For night electrofishing (Table 2.3.2), bluegill (39.67), emerald shiner (37.22), and spotfin shiner (22.24) had the highest reachwide mean C/f s. Following are the fish species with the highest C/f within each stratum: bluegill (83.17, BWCS), emerald shiner (42.17, MCBU), shorthead redhorse (7.95, MCBW), and emerald shiner (65.83, SCB).

Fyke Net

Reachwide mean C/f s for fyke netting (Table 2.3.3) were highest for bluegill (33.54), black crappie (12.81), and white bass (4.24). Bluegill also had the highest C/f within the BWCS stratum (37.54). Shortnose gar (9.06) dominated IMPS catches.

Tandem Fyke Net

Reachwide mean C/f s for tandem fyke netting (Table 2.3.4) were highest for shorthead redhorse

(8.33), followed by white bass (7.79) and bluegill (5.01). These species had the highest C/f within each stratum: bluegill (25.42, BWCO) and shorthead redhorse (9.15, IMPO).

Mini Fyke Net

Spotfin shiner (12.42) had the highest reachwide mean C/f for mini fyke nets (Table 2.3.5), followed by emerald shiner (11.15) and bluegill (7.03). Spotfin shiner (21.07) dominated BWCS C/f for mini fyke nets. Unidentified carpsucker (21.34) was most abundant for mini fyke nets in the IMPS stratum. Mimic shiner had the highest C/f in MCBU areas (21.77). Spotfin shiner (2.12) was most abundant in MCBW stratum, and emerald shiner (26.41) had the highest C/f for SCB stratum.

Tandem Mini Fyke Net

Pugnose minnow (3.33) had the highest reachwide mean C/f for tandem mini fyke netting (Table 2.3.6), followed by walleye (2.17) and johnny darter (1.31). Pugnose minnow had the highest mean C/f in BWCS (26.47), and walleye C/f (2.34) was highest in the IMPO stratum.

Small Hoop Net

For small hoop nets (Table 2.3.7), channel catfish had the highest reachwide mean C/f (0.72) and the highest C/f for these strata: MCBU (1.80), MCBW (1.90), and SCB (2.02). The next highest reachwide mean C/f s were held by bluegill (0.22), common carp (0.13), and freshwater drum (0.13). These species had the greatest C/f within each stratum: BWCO (0.84) bluegill and IMPO (0.20) common carp.

Large Hoop Net

For large hoop nets (Table 2.3.8), channel catfish had the highest reachwide mean C/f (1.32), followed by shorthead redhorse (0.93) and silver redhorse (0.59). Channel catfish had the highest C/f for large hoop nets in the following strata: MCBU (0.98), MCBW (1.58), and SCB (2.80). Shorthead redhorse was most abundant in IMPO areas (1.14). Bluegill

had the highest mean C/f in the BWCO stratum (2.05).

Seine

Spotfin shiner (39.73) had the highest reachwide mean C/f for seining (Table 2.3.9), followed by emerald shiner (30.52) and river shiner (18.20). Following are the fish species with the highest C/f within each stratum: emerald shiner (11.92, BWCS; 97.17, MCBU) and spotfin shiner (46.42, SCB).

Fixed Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

For day electrofishing in 1998 at the two BWCS fixed sites in Pool 8, bluegill (73.19) had the highest mean C/f (Table 2.4.1), followed by emerald shiner (42.22) and mimic shiner (32.53).

Night Electrofishing

Night electrofishing, conducted at four TWZ fixed sites in 1998 (Table 2.4.2), yielded white bass ($C/f = 93.78$) in greatest abundance. The next highest mean C/f s for TWZ night electrofishing were for sauger (62.57) and emerald shiner (21.67).

Fyke Net

The BWCS fyke nets at fixed sites (Table 2.4.3) produced the following catch rates: bluegill (60.94), black crappie (22.27), and white bass (10.07).

Mini Fyke Net

For mini fyke netting at TWZ fixed sites (Table 2.4.4), spottail shiner (32.16), river shiner (25.99), and mimic shiner (12.85) had the highest mean C/f s.

Small Hoop Net

Channel catfish had the highest mean C/f (24.12) for small hoop nets in TWZ (Table 2.4.5). Channel catfish catch was followed by shorthead redhorse (0.49) and bluegill (0.17) in the small hoop nets.

Large Hoop Net

In large hoop nets fished in TWZ (Table 2.4.6), freshwater drum (1.73), flathead catfish (1.07), and shorthead redhorse (0.65) had the highest mean C/f s.

Seine

For fixed-site BWCS seining (Table 2.4.7), emerald shiner (mean $C/f = 230.08$) was most abundant, followed by spotfin shiner (76.67) and mimic shiner (72.75). For TWZ fixed sites, mimic shiner (263.00) had the highest mean C/f . Emerald shiner (128.50) and spotfin shiner (49.50) had the next highest mean C/f s.

Trawl

Freshwater drum (3.25) had the highest mean C/f in TWZ trawls (Table 2.4.8), followed by channel catfish (0.92) and shorthead redhorse (0.33).

Length Distributions of Selected Species

Length distributions are presented for selected species in Figures 2.2 to 2.19. The length distributions presented may be limited by the size selectiveness of the particular gear. Care should be used when trying to interpret length distributions from samples <100 (Anderson and Neumann 1996); they are presented in this report because of local interest in the species by river managers.

Gizzard Shad

The electrofishing length distribution from 451 gizzard shad were dominated by age-0 fish (less than 20 cm long; Figure 2.2). The largest gizzard shad collected in 1998 was about 37 cm long.

Common Carp

The electrofishing length distribution from 742 common carp (Figure 2.3) showed a large group of fish from 48 to 70 cm long. Few common carp

were caught that ranged in length from about 15 to 35 cm. Fish of this size may not be susceptible to the gear or are lost from the population as they are seldom sampled by LTRMP methods in Pool 8.

Smallmouth Buffalo

The electrofishing length distribution from 24 smallmouth buffalo (Figure 2.4) indicated the presence of adult fish from 40 to 60 cm long and also fish less than 20 cm long, presumably from a successful year class. Detectable year classes for this large river species seem inconsistent, occurring in only 1 out of 3 or 4 years. A total of 65 smallmouth buffalo were collected in tandem hoop net sets (Figure 2.5) in 1998. All smallmouth buffalo collected in hoop nets were 38 cm long or longer. A substantial number of smallmouth buffalo between 38 and 44 cm are probably from a successful 1994 year class.

Channel Catfish

The electrofishing length distribution from 48 channel catfish and hoop netting ($n = 625$), Figures 2.6 and 2.7, respectively, show a range of fish from 20 to 60 cm. Hoop net catches indicate the presence of many channel catfish between 20 and 30 cm in total length. Nearly 40% of channel catfish collected by hoop netting were greater than 38 cm.

Northern Pike

The electrofishing length distribution from 103 northern pike (Figure 2.8) and 69 fish collected in fyke nets (Figure 2.9) show fish of all sizes present between 10 and 90 cm. Thirty-three percent of northern pike collected in fyke nets were greater than 66 cm, which is the minimum legal size for northern pike in most inland waters in southern Wisconsin.

White Bass

The electrofishing length distribution from 2,434 white bass indicates that the most abundant size (Figure 2.10) was 10–17 cm long. Less than 5% of the white bass were greater than 20 cm in length.

Bluegill

The electrofishing length distribution from 4,309 bluegills (Figure 2.11) was skewed toward small fish, represented primarily by bluegills less than 12 cm long. The 2,848 bluegills collected in fyke nets (Figure 2.12) averaged much larger than those from electrofishing. The largest group of fish was between 8 and 12 cm long. The percentage of quality-sized fish (>15 cm long; Anderson 1978) collected with fyke nets was about 29%.

Largemouth Bass

The electrofishing length distribution from 635 largemouth bass (Figure 2.13) was widely distributed from 6 to 40 cm long. A large group was present from 6 to 16 cm, and 8% of the collected largemouth bass were >35 cm, which is the minimum legal size for anglers to keep in this reach of the Mississippi River.

White Crappie

The fyke netting length distribution from 34 white crappies (Figure 2.15) shows an even distribution of medium and large fish, but few juveniles. This fish is not abundant in Pool 8, so the lack of juveniles in the sample is not surprising, and should not be interpreted as an indication that the population is endangered.

Black Crappie

The fyke netting length distribution from 1,196 black crappies (Figure 2.14) was dominated by fish from 12 to 26 cm long. About 42% of black crappies were greater than 20 cm in total length.

Sauger

The electrofishing length distribution from 1,894 saugers (Figure 2.16) was dominated by a large group of fish about 14–18 cm long. Only 2.5% of sauger collected were greater than 30 cm.

Walleye

The electrofishing length distribution from 433 walleyes was dominated by young-of-the-year fish, centered around 18 cm (Figure 2.17). The complete size range of walleye extended from 4 to 68 cm long. Eighteen percent of walleyes were greater than 38 cm in total length, which is the minimum legal size for anglers to keep in this reach of the Mississippi River.

Freshwater Drum

The electrofishing length distribution from 301 freshwater drum (Figure 2.18) were dominated by fish from 10 to 20 cm long. The length frequency of 160 freshwater drum collected in fyke nets (Figure 2.19) shows many fish between 10 and 20 cm and also a significant group between 30 and 40 cm. For both gears, the complete size range extended from about 10 to 50 cm long.

Table 2.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 8 of the Mississippi River during 1998. Table entries are numbers of successfully completed standardized monitoring collections.

Table page: 1

Sampling period=1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		8	6	4	4				34
Fyke net	16					4				20
Large hoop net		4	4	4	3		4		2	21
Small hoop net		4	4	4	4		4		2	22
Mini fyke net	8		6	4	4	4			2	28
Night electrofishing	2		4	4	4				4	18
Seine	8		4	8					4	24
Trawling									4	4
Tandem fyke net		4					2			6
Tandem mini fyke net		4					2			6
SUBTOTAL	46	16	30	30	19	12	12	0	18	183

Sampling period=2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		8	6	4	4				34
Fyke net	16					4				20
Large hoop net		4	4	4	4		4		2	22
Small hoop net		4	4	4	4		4		2	22
Mini fyke net	8		6	4	4	4			2	28
Night electrofishing	2		4	4	4				4	18
Seine	8		4	8					4	24
Trawling									4	4
Tandem fyke net		4					2			6
Tandem mini fyke net		4					2			6
SUBTOTAL	46	16	30	30	20	12	12	0	18	184

Sampling period=3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		8	6	4	4				34
Fyke net	16					4				20
Large hoop net		4	4	4	4		4		2	22
Small hoop net		4	4	4	4		4		2	22
Mini fyke net	8		6	4	4	4			2	28
Night electrofishing	2		4	4	4				4	18
Seine	8		4	8					4	24
Trawling									4	4
Tandem fyke net		4					2			6
Tandem mini fyke net		4					2			6
SUBTOTAL	46	16	30	30	20	12	12	0	18	184
	=====									
	138	48	90	90	59	36	36	0	54	551

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam

BWCO - Backwater, contiguous, offshore SCB - Side channel border

IMPS - Impounded, shoreline TRI - Tributary mouth

IMPO - Impounded, offshore TWZ - Tailwater

MCBU - Main channel border, unstructured

Table 2.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	9	2	-	1	1	-	-	-	-	-	-	-	13
2	Silver lamprey	<i>Ichthyomyzon unicuspis</i>	5	1	-	-	-	-	-	-	-	-	-	-	6
3	Shovelnose sturgeon	<i>Scaphirhynchus platorynchus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
4	Longnose gar	<i>Lepisosteus osseus</i>	8	26	73	10	14	-	5	-	2	-	-	-	138
5	Shortnose gar	<i>Lepisosteus platostomus</i>	6	10	204	27	36	2	2	-	2	-	-	-	289
6	Bowfin	<i>Amia calva</i>	18	4	28	28	1	2	-	-	3	-	-	-	86
7	Goldeye	<i>Hiodon alosoides</i>	-	1	-	-	-	-	-	-	-	-	-	-	1
8	Mooneye	<i>Hiodon tergisus</i>	7	62	1	-	-	-	-	-	-	-	-	-	70
9	Gizzard shad	<i>Dorosoma cepedianum</i>	133	318	46	9	13	5	32	-	1	-	-	-	557
10	Spotfin shiner	<i>Cyprinella spiloptera</i>	1451	709	-	898	4	3989	-	-	-	-	-	-	7051
11	Common carp	<i>Cyprinus carpio</i>	570	172	93	61	377	40	10	6	22	-	2	1353	
12	Silver chub	<i>Macrhybopsis storeriana</i>	1	1	-	-	-	-	-	-	-	-	-	-	2
13	Golden shiner	<i>Notemigonus crysoleucas</i>	34	5	24	11	6	3	5	-	-	-	-	-	88
14	Emerald shiner	<i>Notropis atherinoides</i>	4069	1803	-	612	121	6861	-	-	-	-	-	-	13466
15	River shiner	<i>Notropis blennius</i>	363	402	-	201	-	2264	-	-	-	-	-	-	3230
16	Spottail shiner	<i>Notropis hudsonius</i>	137	60	-	381	19	319	-	-	-	-	-	-	916
17	Sand shiner	<i>Notropis stramineus</i>	-	-	-	1	-	11	-	-	-	-	-	-	12
18	Weed shiner	<i>Notropis texanus</i>	21	-	-	27	2	19	-	-	-	-	-	-	69
19	Mimic shiner	<i>Opsopoeodus volucellus</i>	1850	834	-	411	7	5113	-	-	-	-	-	-	8215
20	Pugnose minnow	<i>Opsopoeodus emiliae</i>	77	15	-	126	618	165	-	-	-	-	-	-	1001
21	Farthead minnow	<i>Pimephales promelas</i>	1	2	-	6	2	-	-	-	-	-	-	-	11
22	Bullhead minnow	<i>Pimephales vigilax</i>	589	237	-	313	79	753	-	-	-	-	-	-	1971
23	Unidentified minnow	<i>Unidentified Cyprinidae</i>	-	2	-	3	-	10	-	-	-	-	-	-	15
24	River carpsucker	<i>Carpiodon carpio</i>	17	16	4	4	-	-	-	-	3	-	-	-	44
25	Quillback	<i>Carpiodon cyprinus</i>	39	53	-	1	114	5	274	-	-	-	-	-	486
26	Highfin carpsucker	<i>Carpiodon velifer</i>	2	3	-	-	-	-	-	-	-	-	-	-	5
27	Unidentified carpsucker	<i>Carpiodon sp.</i>	14	-	-	267	-	213	-	-	-	-	-	-	494
28	White sucker	<i>Catostomus commersoni</i>	1	2	3	-	2	-	-	-	-	-	-	-	8
29	Blue sucker	<i>Cyclopterus elongatus</i>	10	4	-	-	-	-	-	-	-	-	-	-	14
30	Northern hog sucker	<i>Hypentelium nigricans</i>	1	1	-	-	-	-	-	-	-	-	-	-	2
31	Smallmouth buffalo	<i>Ictalurus bubalus</i>	5	19	5	9	175	14	-	2	63	-	-	-	292
32	Bigmouth buffalo	<i>Ictalurus cyprinellus</i>	4	2	5	-	6	-	-	-	-	-	-	-	17
33	Unidentified buffalo	<i>Ictalurus sp.</i>	2	-	-	-	78	3	10	-	-	-	-	-	93
34	Spotted sucker	<i>Mylorema melanops</i>	188	38	47	13	1	-	-	-	1	-	-	-	288
35	Silver redhorse	<i>Moxostoma anisurum</i>	300	327	88	95	30	5	25	2	32	-	1	905	
36	River redhorse	<i>Moxostoma carinatum</i>	30	36	-	-	-	-	-	-	66	-	-	-	66
37	Golden redhorse	<i>Moxostoma erythrurum</i>	240	173	6	10	1	-	-	-	3	-	-	-	433
38	Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	615	698	60	173	9	4	5	17	85	-	4	1670	
39	Unidentified redhorse	<i>Moxostoma sp.</i>	351	28	-	231	-	212	-	-	-	-	-	-	835

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting

S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table page:

Table 2.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Black bullhead	<i>Ameiurus melas</i>	-	-	8	-	1	-	-	-	1	-	-	-	10
41	Yellow bullhead	<i>Ameiurus natalis</i>	1	-	1	-	1	-	-	-	1	-	-	-	3
42	Brown bullhead	<i>Ameiurus nebulosus</i>	1	-	-	-	1	-	-	-	1	-	-	-	3
43	Channel catfish	<i>Ictalurus punctatus</i>	17	31	9	5	8	4	-	447	178	-	11	710	
44	Stonecat	<i>Noturus flavus</i>	1	1	-	-	-	-	-	-	-	-	-	-	2
45	Tadpole madtom	<i>Noturus gyrinus</i>	8	3	-	-	13	5	21	-	-	-	-	-	50
46	Flathead catfish	<i>Pylodictis olivaris</i>	10	39	22	5	17	-	10	41	-	-	-	1	145
47	Northern pike	<i>Esox lucius</i>	73	30	56	13	4	2	7	1	6	-	-	-	192
48	Central mudminnow	<i>Umbra limi</i>	-	-	-	-	3	-	-	-	-	-	-	-	3
49	Brown trout	<i>Salmo trutta</i>	-	-	-	-	1	-	-	-	-	-	-	-	1
50	Trout perch	<i>Perca</i> sp.	1	1	-	-	1	-	1	-	-	-	-	-	4
51	Burbot	<i>Lota lota</i>	1	1	-	-	1	-	-	-	-	-	-	-	3
52	Brook silverside	<i>Labidesthes sicculus</i>	49	77	-	-	16	1	554	-	-	-	-	-	697
53	Brook stickleback	<i>Culaea inconstans</i>	-	-	-	-	5	-	-	-	-	-	-	-	5
54	White bass	<i>Morone chrysops</i>	108	2326	304	138	148	8	30	3	10	-	-	-	3075
55	Yellow bass	<i>Morone mississippiensis</i>	-	2	-	-	-	-	-	-	-	-	-	-	2
56	Rock bass	<i>Ambloplites rupestris</i>	187	152	15	5	22	10	59	5	1	-	-	-	456
57	Green sunfish	<i>Lepomis cyanellus</i>	119	26	3	1	6	-	19	1	-	-	-	-	175
58	Pumpkinseed	<i>Lepomis gibbosus</i>	109	6	66	4	21	9	23	-	1	-	-	-	239
59	Walleye	<i>Lepomis gibbosus</i>	2	-	1	2	4	-	-	-	-	-	-	-	9
60	Orangespotted sunfish	<i>Lepomis humilis</i>	147	65	4	5	22	69	111	3	-	-	-	-	426
61	Bluegill	<i>Lepomis macrochirus</i>	3023	1286	2187	661	583	239	1061	41	91	-	-	-	9172
62	Green x pumpkinseed sunfish	<i>L. cyanellus x gibbosus</i>	1	-	1	-	-	-	-	-	-	-	-	-	2
63	Green x warmouth sunfish	<i>L. cyanellus x gulosus</i>	-	1	-	-	-	-	-	-	-	-	-	-	1
64	Green x bluegill sunfish	<i>L. cyanellus x macrochirus</i>	2	1	-	1	-	-	-	-	-	-	-	-	4
65	Pumpkinseed x orange-spotted sunfish	<i>L. gibbosus x humilis</i>	-	1	-	1	-	-	-	-	-	-	-	-	2
66	Pumpkinseed x bluegill	<i>L. gibbosus x macrochirus</i>	-	1	-	1	-	-	-	-	-	-	-	-	1
67	Unidentified Lepomis	<i>Lepomis</i> sp.	26	82	-	-	-	-	167	87	435	-	-	-	797
68	Smallmouth bass	<i>Micropterus dolomieu</i>	529	613	1	3	17	1	29	-	3	-	-	-	1196
69	Largemouth bass	<i>Micropterus salmoides</i>	487	148	32	-	22	18	34	2	-	-	-	-	743
70	White crappie	<i>Pomoxis annularis</i>	7	7	23	11	2	1	3	5	-	-	-	-	62
71	Black crappie	<i>Pomoxis nigromaculatus</i>	152	88	874	322	175	42	52	3	34	-	-	-	1742
72	Unidentified sunfish	Unidentified Centrarchidae	-	-	-	-	-	-	-	-	2	-	-	-	2
73	Crystal darter	<i>Ammocrypta asprella</i>	-	-	-	-	-	-	-	-	1	-	-	-	1
74	Western sand darter	<i>Ammocrypta clara</i>	6	47	-	-	-	-	-	-	19	-	-	-	73
75	Mud darter	<i>Etheostoma asprigene</i>	17	9	-	-	9	2	20	-	-	-	-	-	57
76	Iowa darter	<i>Etheostoma exile</i>	2	1	-	1	2	3	-	-	-	-	-	-	9
77	Johnny darter	<i>Etheostoma nigrum</i>	460	57	-	-	205	35	498	-	-	-	-	-	1255
78	Banded darter	<i>Etheostoma zonale</i>	1	-	-	-	-	-	-	-	-	-	-	-	1

Gears: D - Day electrofishing

S - Seining

HS - Small hoop netting

HL - Large hoop netting

G - Gill netting

TA - Trammel netting, anchored sets

T - Trawling (4.8-m bottom trawl)

Table 2.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 8 of the Mississippi River. See Table 2.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
79	Yellow perch	<i>Perca flavescens</i>	469	86	256	149	37	37	153	11	1	-	-	1199	
80	Logperch	<i>Perca caprodes</i>	561	135	-	-	104	95	532	-	-	-	-	1427	
81	Blacksides darter	<i>Percina maculata</i>	1	-	-	-	-	-	-	-	-	-	-	1	
82	Slenderhead darter	<i>Percina phoxocephala</i>	15	14	-	-	2	3	13	-	-	-	-	47	
83	River darter	<i>Percina shumardi</i>	56	19	-	-	45	14	65	-	-	-	-	199	
84	Sauper	<i>Stizostedion canadense</i>	228	1666	40	51	37	44	12	4	2	-	-	2087	
85	Walleye	<i>Stizostedion vitreum</i>	99	334	19	24	7	56	14	2	2	-	-	557	
86	Sauper x walleye hybrid	<i>S. canadense x vitreum</i>	1	-	-	1	-	-	-	-	-	-	-	2	
87	Freshwater drum	<i>Aplochiton grunniens</i>	54	247	74	86	62	8	5	15	68	-	-	39	658
			18199	13667	4684	1938	6108	1744	24076	577	665	0	62	71720	

Table page:

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting
 S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Chestnut lamprey	0.13 (0.10)	0.33 (0.29)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Silver lamprey	0.06 (0.03)	0.00 (0.00)	0.17 (0.11)	0.00 (0.00)	0.00 (0.00)	0.13 (0.07)
Longnose gar	0.10 (0.04)	0.08 (0.06)	0.00 (0.00)	0.17 (0.12)	0.00 (0.00)	0.08 (0.06)
Shortnose gar	0.08 (0.04)	0.08 (0.06)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.13 (0.09)
Bowfin	0.13 (0.04)	0.25 (0.09)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.08 (0.06)
Mooneye	0.09 (0.06)	0.00 (0.00)	0.08 (0.08)	0.17 (0.17)	0.00 (0.00)	0.13 (0.13)
Gizzard shad	1.11 (0.43)	0.54 (0.26)	0.42 (0.34)	0.28 (0.19)	1.56 (0.63)	2.21 (1.10)
Spotfin shiner	14.81 (3.46)	15.17 (5.19)	0.83 (0.51)	22.00 (8.50)	4.41 (4.30)	12.04 (5.98)
Common carp	6.86 (0.98)	4.58 (1.66)	10.58 (4.23)	4.67 (1.11)	0.33 (0.14)	9.79 (1.94)
Silver chub	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Golden shiner	0.29 (0.12)	0.75 (0.35)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.06)
Emerald shiner	45.60 (32.72)	103.58 (95.84)	5.92 (3.51)	29.67 (15.03)	6.21 (3.38)	8.54 (3.25)
River shiner	4.09 (1.76)	2.96 (2.02)	0.08 (0.08)	12.11 (7.05)	3.11 (2.56)	0.79 (0.49)
Spottail shiner	0.62 (0.23)	1.33 (0.59)	0.50 (0.50)	0.50 (0.50)	0.00 (0.00)	0.08 (0.06)
Weed shiner	0.13 (0.07)	0.13 (0.07)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.21 (0.17)
Mimic shiner	17.53 (13.91)	41.04 (40.52)	0.00 (0.00)	14.94 (9.33)	6.05 (4.01)	0.33 (0.22)
Pugnose minnow	0.53 (0.15)	0.92 (0.36)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.54 (0.25)
Fathead minnow	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Bullhead minnow	5.36 (1.40)	5.88 (2.18)	1.83 (1.66)	6.61 (4.01)	1.32 (1.24)	4.63 (1.97)
River carpsucker	0.18 (0.10)	0.46 (0.29)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Quillback	0.30 (0.11)	0.54 (0.30)	1.17 (0.90)	0.11 (0.08)	0.00 (0.00)	0.08 (0.06)
Highfin carpsucker	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Unidentified carpsucker	0.06 (0.06)	0.00 (0.00)	1.17 (1.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
White sucker	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Blue sucker	0.13 (0.08)	0.04 (0.04)	0.00 (0.00)	0.39 (0.29)	0.00 (0.00)	0.08 (0.08)
Northern hog sucker	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Smallmouth buffalo	0.05 (0.03)	0.08 (0.06)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Bigmouth buffalo	0.03 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)	0.04 (0.04)
Unidentified buffalo	0.03 (0.03)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Spotted sucker	1.72 (0.44)	3.83 (1.14)	0.50 (0.34)	0.11 (0.11)	0.00 (0.00)	0.96 (0.58)
Silver redhorse	3.00 (0.41)	2.29 (0.84)	1.00 (0.51)	2.50 (0.77)	3.81 (0.82)	4.21 (0.65)
River redhorse	0.03 (0.02)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)	1.27 (0.42)	0.04 (0.04)
Golden redhorse	2.70 (0.55)	0.79 (0.28)	1.25 (0.55)	2.56 (0.75)	1.84 (0.55)	4.71 (1.36)
Shorthead redhorse	4.04 (0.55)	2.67 (0.67)	3.92 (1.87)	4.78 (1.26)	11.86 (2.54)	4.79 (1.06)
Unidentified redhorse	3.85 (3.08)	0.71 (0.41)	3.92 (3.74)	13.39 (13.39)	0.00 (0.00)	0.92 (0.76)
Yellow bullhead	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Channel catfish	0.13 (0.05)	0.17 (0.10)	0.08 (0.08)	0.17 (0.09)	0.33 (0.21)	0.08 (0.06)
Stonecat	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Tadpole madtom	0.09 (0.03)	0.21 (0.08)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Flathead catfish	0.10 (0.04)	0.04 (0.04)	0.08 (0.08)	0.17 (0.09)	0.00 (0.00)	0.13 (0.07)
Northern pike	0.62 (0.11)	0.92 (0.22)	0.00 (0.00)	0.17 (0.09)	0.00 (0.00)	0.71 (0.19)
Trout perch	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Burbot	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)
Brook silverside	0.48 (0.36)	1.17 (1.04)	0.08 (0.08)	0.22 (0.17)	0.29 (0.29)	0.08 (0.06)
White bass	0.92 (0.36)	1.13 (0.91)	0.33 (0.14)	1.17 (0.44)	1.16 (0.84)	0.67 (0.39)
Rock bass	2.13 (0.37)	2.00 (0.49)	0.50 (0.42)	1.56 (0.82)	0.10 (0.10)	2.83 (0.73)
Green sunfish	1.53 (1.02)	3.58 (2.99)	0.33 (0.26)	0.44 (0.23)	0.15 (0.10)	0.50 (0.25)
Pumpkinseed	1.09 (0.52)	2.79 (1.50)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.38 (0.22)
Warmouth	0.03 (0.02)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Orangespotted sunfish	1.60 (0.76)	3.96 (2.20)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.67 (0.33)
Bluegill	25.32 (5.71)	54.38 (16.39)	3.33 (1.45)	3.06 (0.91)	1.31 (0.69)	15.71 (3.42)
Green x pumpkinseed sunfish	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)
Green x bluegill sunfish	0.03 (0.02)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Unidentified Lepomis	0.30 (0.19)	0.83 (0.55)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Smallmouth bass	4.42 (0.65)	1.25 (0.35)	10.50 (2.55)	6.50 (0.97)	5.67 (1.31)	5.21 (1.55)
Largemouth bass	3.54 (0.64)	6.63 (1.79)	2.67 (1.85)	0.83 (0.29)	1.26 (0.80)	2.54 (0.48)
White crappie	0.07 (0.04)	0.21 (0.12)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Black crappie	1.64 (0.35)	2.83 (0.84)	0.17 (0.11)	0.22 (0.13)	0.10 (0.10)	1.63 (0.53)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MC BU - Main channel border, unstructured

Table 2.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 3

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Western sand darter	0.08 (0.05)	0.00 (0.00)	0.00 (0.00)	0.33 (0.23)	0.00 (0.00)	0.00 (0.00)
Mud darter	0.15 (0.05)	0.21 (0.08)	0.17 (0.11)	0.06 (0.06)	0.00 (0.00)	0.17 (0.10)
Johnny darter	2.63 (0.98)	5.63 (2.82)	1.00 (0.37)	0.89 (0.43)	0.10 (0.10)	1.21 (0.53)
Banded darter	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Yellow perch	2.05 (0.45)	4.33 (1.05)	1.58 (0.96)	0.17 (0.12)	0.00 (0.00)	1.21 (0.69)
Logperch	2.81 (0.48)	3.00 (1.06)	9.25 (2.59)	3.11 (1.07)	6.44 (5.58)	1.58 (0.43)
Blackside darter	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Slenderhead darter	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.92 (0.66)	0.04 (0.04)
River darter	0.36 (0.31)	0.13 (0.09)	0.00 (0.00)	1.39 (1.33)	0.65 (0.57)	0.00 (0.00)
Sauger	2.03 (0.24)	2.54 (0.46)	3.83 (1.50)	0.67 (0.16)	0.34 (0.15)	2.17 (0.42)
Walleye	0.75 (0.14)	1.00 (0.23)	1.33 (0.40)	0.44 (0.29)	0.37 (0.20)	0.63 (0.25)
Sauger x walleye hybrid	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Freshwater drum	0.44 (0.14)	0.25 (0.14)	0.33 (0.19)	0.22 (0.22)	0.32 (0.11)	0.75 (0.33)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	MCBW	SCB
Chestnut lamprey	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Longnose gar	0.23 (0.15)	0.17 (0.17)	0.00 (0.00)	0.39 (0.20)	0.42 (0.34)
Shortnose gar	0.23 (0.11)	0.17 (0.17)	0.00 (0.00)	0.03 (0.03)	0.42 (0.23)
Bowfin	0.07 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.11)
Mooneye	0.32 (0.16)	0.00 (0.00)	1.17 (0.66)	1.41 (0.93)	0.08 (0.08)
Gizzard shad	2.89 (1.23)	1.83 (0.98)	6.92 (4.82)	2.30 (1.35)	1.42 (0.57)
Spotfin shiner	22.24 (10.24)	4.00 (2.72)	6.75 (3.00)	0.11 (0.08)	48.17 (25.56)
Common carp	4.20 (0.89)	4.67 (1.74)	2.92 (0.87)	0.73 (0.40)	4.58 (1.52)
Silver chub	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Golden shiner	0.15 (0.08)	0.33 (0.21)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Emerald shiner	37.22 (18.42)	2.33 (0.92)	42.17 (17.88)	2.22 (0.92)	65.83 (45.03)
River shiner	9.81 (8.70)	0.00 (0.00)	4.50 (2.17)	0.26 (0.22)	21.92 (21.83)
Spottail shiner	1.20 (0.57)	1.17 (0.98)	0.50 (0.26)	0.00 (0.00)	1.67 (1.10)
Mimic shiner	20.61 (10.18)	0.67 (0.67)	20.50 (10.52)	0.65 (0.26)	38.75 (24.79)
Pugnose minnow	0.87 (0.84)	2.33 (2.33)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Fathead minnow	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Bullhead minnow	7.68 (2.30)	4.00 (1.15)	1.67 (0.70)	0.04 (0.04)	14.67 (5.68)
Unidentified minnow	0.07 (0.07)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)
River carpsucker	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.11 (0.06)	0.00 (0.00)
Quillback	0.38 (0.14)	0.00 (0.00)	1.17 (0.56)	0.00 (0.00)	0.25 (0.13)
Blue sucker	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.14 (0.10)	0.00 (0.00)
Smallmouth buffalo	0.16 (0.08)	0.00 (0.00)	0.25 (0.18)	0.03 (0.03)	0.25 (0.18)
Bigmouth buffalo	0.06 (0.06)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Spotted sucker	0.95 (0.38)	1.50 (0.85)	0.33 (0.19)	0.00 (0.00)	0.83 (0.56)
Silver redhorse	4.46 (0.91)	1.83 (1.01)	7.50 (2.47)	2.48 (0.78)	5.00 (1.47)
River redhorse	0.06 (0.04)	0.00 (0.00)	0.08 (0.08)	0.89 (0.46)	0.08 (0.08)
Golden redhorse	2.02 (0.51)	1.33 (1.15)	1.83 (0.81)	2.73 (0.98)	2.75 (0.58)
Shorthead redhorse	6.83 (1.39)	4.33 (2.04)	10.25 (4.09)	7.95 (2.85)	7.00 (1.67)
Unidentified redhorse	0.96 (0.55)	0.67 (0.67)	0.08 (0.08)	0.00 (0.00)	1.75 (1.26)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	MCBW	SCB
Channel catfish	0.10 (0.05)	0.00 (0.00)	0.42 (0.19)	0.45 (0.18)	0.00 (0.00)
Stonecat	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Tadpole madtom	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Flathead catfish	0.58 (0.19)	0.17 (0.17)	0.50 (0.15)	0.58 (0.26)	1.00 (0.44)
Northern pike	0.33 (0.17)	0.33 (0.33)	0.17 (0.11)	0.04 (0.04)	0.42 (0.29)
Trout perch	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Brook silverside	2.71 (1.36)	6.67 (3.77)	0.50 (0.26)	0.04 (0.04)	0.50 (0.29)
White bass	10.46 (3.17)	5.00 (1.65)	23.17 (11.63)	1.62 (0.61)	7.75 (3.46)
Rock bass	3.36 (0.85)	2.83 (1.33)	2.58 (1.44)	0.00 (0.00)	4.33 (1.56)
Green sunfish	1.17 (0.88)	2.83 (2.44)	0.08 (0.08)	0.00 (0.00)	0.33 (0.19)
Pumpkinseed	0.27 (0.18)	0.67 (0.49)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Orangespotted sunfish	3.35 (2.75)	8.83 (7.67)	0.08 (0.08)	0.00 (0.00)	0.42 (0.26)
Bluegill	39.67 (13.46)	83.17 (36.71)	10.00 (4.21)	2.09 (1.14)	18.75 (6.88)
Green x warmouth sunfish	0.06 (0.06)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Green x bluegill sunfish	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Unidentified Lepomis	4.84 (3.92)	13.33 (10.94)	0.00 (0.00)	0.00 (0.00)	0.17 (0.11)
Smallmouth bass	7.01 (1.79)	2.83 (2.07)	9.67 (2.44)	5.78 (1.31)	9.17 (3.83)
Largemouth bass	2.67 (0.96)	5.33 (2.56)	0.25 (0.18)	0.26 (0.26)	1.75 (0.69)
White crappie	0.12 (0.08)	0.33 (0.21)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Black crappie	2.08 (1.05)	3.83 (2.87)	1.42 (0.69)	0.40 (0.31)	0.92 (0.29)
Western sand darter	0.14 (0.10)	0.00 (0.00)	0.58 (0.42)	0.67 (0.67)	0.00 (0.00)
Mud darter	0.35 (0.18)	0.67 (0.49)	0.17 (0.11)	0.00 (0.00)	0.17 (0.11)
Iowa darter	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Johnny darter	2.14 (0.86)	2.17 (1.22)	0.17 (0.11)	0.00 (0.00)	3.33 (1.87)
Yellow perch	1.33 (0.54)	1.67 (0.61)	0.17 (0.11)	0.00 (0.00)	1.75 (1.24)
Logperch	2.16 (0.67)	2.50 (1.28)	2.50 (0.61)	0.71 (0.43)	1.67 (1.16)
Slenderhead darter	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.23 (0.18)	0.00 (0.00)
River darter	0.13 (0.09)	0.00 (0.00)	0.00 (0.00)	0.12 (0.08)	0.33 (0.22)
Sauger	9.56 (1.12)	7.83 (1.38)	17.83 (3.67)	1.80 (0.53)	6.17 (1.19)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 3

Common name	ALL	BWCS	MCBU	MCBW	SCB
Walleye	4.13 (0.50)	3.50 (0.99)	6.42 (1.14)	2.42 (0.83)	3.33 (0.56)
Freshwater drum	1.29 (0.31)	1.50 (0.72)	1.58 (0.45)	1.71 (0.47)	0.92 (0.36)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS
Longnose gar	0.83 (0.27)	0.80 (0.30)	1.07 (0.61)
Shortnose gar	3.09 (0.71)	2.23 (0.55)	9.06 (4.18)
Bowfin	0.50 (0.13)	0.53 (0.15)	0.32 (0.18)
Mooneye	0.02 (0.02)	0.03 (0.03)	0.00 (0.00)
Gizzard shad	0.48 (0.22)	0.37 (0.24)	1.18 (0.64)
Common carp	1.53 (0.47)	1.46 (0.52)	2.03 (0.80)
Golden shiner	0.44 (0.20)	0.50 (0.23)	0.00 (0.00)
River carpsucker	0.08 (0.04)	0.08 (0.05)	0.08 (0.08)
White sucker	0.02 (0.02)	0.03 (0.03)	0.00 (0.00)
Smallmouth buffalo	0.07 (0.03)	0.03 (0.03)	0.33 (0.18)
Bigmouth buffalo	0.12 (0.09)	0.13 (0.11)	0.00 (0.00)
Spotted sucker	0.90 (0.37)	1.01 (0.42)	0.16 (0.16)
Silver redhorse	1.30 (0.31)	1.27 (0.34)	1.49 (0.63)
Golden redhorse	0.09 (0.04)	0.08 (0.04)	0.16 (0.11)
Shorthead redhorse	0.85 (0.18)	0.73 (0.18)	1.67 (0.64)
Black bullhead	0.16 (0.14)	0.18 (0.16)	0.00 (0.00)
Yellow bullhead	0.03 (0.03)	0.03 (0.03)	0.00 (0.00)
Channel catfish	0.04 (0.03)	0.00 (0.00)	0.34 (0.26)
Flathead catfish	0.32 (0.09)	0.35 (0.10)	0.08 (0.08)
Northern pike	0.91 (0.23)	1.02 (0.26)	0.17 (0.12)
White bass	4.24 (2.42)	4.46 (2.77)	2.73 (1.62)
Rock bass	0.21 (0.06)	0.19 (0.06)	0.33 (0.18)
Pumpkinseed	0.84 (0.24)	0.96 (0.27)	0.00 (0.00)
Orangespotted sunfish	0.06 (0.04)	0.06 (0.04)	0.09 (0.09)
Bluegill	33.54 (5.45)	37.54 (6.26)	6.09 (1.89)
Pumpkinseed x bluegill	0.02 (0.02)	0.03 (0.03)	0.00 (0.00)
Smallmouth bass	0.01 (0.01)	0.00 (0.00)	0.08 (0.08)
Largemouth bass	0.36 (0.11)	0.39 (0.12)	0.15 (0.15)
White crappie	0.44 (0.14)	0.50 (0.16)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS
Black crappie	12.81 (2.08)	13.45 (2.35)	8.44 (3.11)
Yellow perch	3.84 (0.96)	4.39 (1.10)	0.00 (0.00)
Sauger	0.54 (0.21)	0.39 (0.23)	1.58 (0.56)
Walleye	0.25 (0.07)	0.17 (0.07)	0.81 (0.29)
Freshwater drum	1.10 (0.56)	1.11 (0.63)	1.01 (0.59)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO
Chestnut lamprey	0.07 (0.07)	0.00 (0.00)	0.08 (0.08)
Longnose gar	0.05 (0.03)	0.42 (0.24)	0.00 (0.00)
Shortnose gar	0.54 (0.21)	0.85 (0.30)	0.50 (0.23)
Bowfin	0.21 (0.12)	1.12 (0.79)	0.08 (0.08)
Gizzard shad	0.42 (0.28)	0.13 (0.09)	0.47 (0.32)
Common carp	1.05 (0.32)	2.05 (0.37)	0.91 (0.36)
Golden shiner	0.05 (0.03)	0.44 (0.26)	0.00 (0.00)
River carpsucker	0.08 (0.07)	0.12 (0.09)	0.08 (0.08)
Quillback	0.07 (0.07)	0.00 (0.00)	0.08 (0.08)
Smallmouth buffalo	0.38 (0.17)	0.16 (0.09)	0.41 (0.20)
Spotted sucker	0.07 (0.05)	0.53 (0.37)	0.00 (0.00)
Silver redhorse	2.24 (1.64)	2.80 (1.11)	2.16 (1.87)
Golden redhorse	0.45 (0.29)	0.17 (0.13)	0.49 (0.33)
Shorthead redhorse	8.33 (5.10)	2.55 (1.46)	9.15 (5.82)
Channel catfish	0.15 (0.09)	0.13 (0.09)	0.16 (0.10)
Flathead catfish	0.15 (0.14)	0.14 (0.10)	0.16 (0.16)
Northern pike	0.13 (0.08)	0.50 (0.28)	0.08 (0.08)
White bass	7.79 (4.19)	1.18 (0.41)	8.72 (4.78)
Rock bass	0.28 (0.20)	0.04 (0.04)	0.32 (0.23)
Green sunfish	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
Pumpkinseed	0.02 (0.01)	0.16 (0.09)	0.00 (0.00)
Warmouth	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Orangespotted sunfish	0.02 (0.02)	0.20 (0.14)	0.00 (0.00)
Bluegill	5.01 (1.80)	25.42 (10.92)	2.14 (1.37)
Green x bluegill sunfish	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Smallmouth bass	0.14 (0.09)	0.04 (0.04)	0.16 (0.10)
White crappie	0.05 (0.03)	0.44 (0.21)	0.00 (0.00)
Black crappie	2.73 (0.85)	12.24 (5.06)	1.39 (0.67)
Yellow perch	1.24 (0.62)	5.62 (2.43)	0.63 (0.63)

Strata: BWCS - Backwater, contiguous, shoreline

BWCO - Backwater, contiguous, offshore

IMPS - Impounded, shoreline

IMPO - Impounded, offshore

MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam

SCB - Side channel border

TRI - Tributary mouth

TWZ - Tailwater

Table 2.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCO	IMPO
Sauger	2.34 (0.76)	0.77 (0.29)	2.56 (0.87)
Walleye	0.75 (0.46)	0.58 (0.20)	0.78 (0.52)
Sauger x walleye hybrid	0.07 (0.07)	0.00 (0.00)	0.08 (0.08)
Freshwater drum	1.46 (0.54)	2.83 (2.13)	1.26 (0.54)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Chestnut lamprey	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Longnose gar	0.09 (0.04)	0.09 (0.06)	0.88 (0.59)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Shortnose gar	0.44 (0.20)	0.79 (0.44)	0.81 (0.51)	0.56 (0.56)	0.00 (0.00)	0.00 (0.00)
Bowfin	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)
Gizzard shad	0.10 (0.05)	0.16 (0.09)	0.08 (0.08)	0.16 (0.16)	0.32 (0.32)	0.00 (0.00)
Spotfin shiner	12.42 (3.99)	21.07 (10.83)	4.05 (2.50)	3.69 (1.98)	2.12 (1.78)	11.08 (3.91)
Common carp	3.35 (2.15)	0.20 (0.10)	20.35 (12.52)	9.93 (9.02)	0.00 (0.00)	0.00 (0.00)
Golden shiner	0.09 (0.04)	0.20 (0.10)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Emerald shiner	11.15 (9.43)	3.00 (1.32)	0.73 (0.38)	0.42 (0.27)	0.07 (0.07)	26.41 (24.93)
River shiner	0.75 (0.36)	0.35 (0.23)	0.48 (0.32)	1.22 (1.05)	0.00 (0.00)	0.88 (0.66)
Spottail shiner	1.55 (0.73)	0.04 (0.04)	10.99 (8.73)	3.62 (2.56)	0.00 (0.00)	0.43 (0.25)
Weed shiner	0.43 (0.23)	0.91 (0.64)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.27 (0.16)
Mimic shiner	6.18 (4.65)	1.74 (1.35)	1.11 (0.75)	21.77 (20.16)	0.24 (0.18)	1.44 (1.02)
Pugnose minnow	1.72 (0.60)	3.99 (1.73)	1.40 (0.83)	0.24 (0.17)	0.00 (0.00)	0.61 (0.29)
Fathead minnow	0.08 (0.04)	0.04 (0.04)	0.16 (0.11)	0.16 (0.16)	0.00 (0.00)	0.05 (0.05)
Bullhead minnow	3.57 (1.21)	6.06 (3.25)	7.07 (4.72)	0.90 (0.57)	0.08 (0.08)	2.51 (1.11)
Unidentified minnow	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)
Quillback	0.54 (0.34)	0.04 (0.04)	8.83 (6.79)	0.40 (0.28)	0.00 (0.00)	0.00 (0.00)
Unidentified carpsucker	1.13 (0.76)	0.00 (0.00)	21.34 (15.36)	0.32 (0.32)	0.00 (0.00)	0.00 (0.00)
White sucker	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	1.89 (1.03)	0.12 (0.12)	7.23 (4.85)	6.49 (4.38)	0.00 (0.00)	0.00 (0.00)
Bigmouth buffalo	0.05 (0.04)	0.00 (0.00)	0.33 (0.33)	0.16 (0.16)	0.00 (0.00)	0.00 (0.00)
Unidentified buffalo	0.32 (0.25)	0.00 (0.00)	6.38 (5.18)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Spotted sucker	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)
Silver redhorse	0.37 (0.26)	0.00 (0.00)	1.06 (0.52)	1.30 (1.12)	0.00 (0.00)	0.06 (0.06)
Golden redhorse	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Shorthead redhorse	0.10 (0.05)	0.08 (0.08)	0.33 (0.19)	0.26 (0.19)	0.00 (0.00)	0.00 (0.00)
Unidentified redhorse	1.52 (0.69)	0.12 (0.07)	15.25 (8.86)	3.14 (2.35)	0.00 (0.00)	0.00 (0.00)
Black bullhead	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Yellow bullhead	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.08 (0.05)	0.21 (0.15)	0.16 (0.16)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)
Tadpole madtom	0.15 (0.07)	0.08 (0.06)	0.47 (0.27)	0.24 (0.24)	0.00 (0.00)	0.11 (0.07)
Flathead catfish	0.24 (0.17)	0.71 (0.51)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Northern pike	0.06 (0.03)	0.04 (0.04)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.11 (0.07)
Central mudminnow	0.04 (0.04)	0.12 (0.12)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Brown trout	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Brook silverside	0.19 (0.10)	0.40 (0.25)	0.00 (0.00)	0.24 (0.24)	0.00 (0.00)	0.00 (0.00)
Brook stickleback	0.05 (0.03)	0.00 (0.00)	0.25 (0.25)	0.08 (0.08)	0.00 (0.00)	0.05 (0.05)
White bass	1.59 (0.88)	0.04 (0.04)	5.53 (3.17)	5.15 (3.75)	0.00 (0.00)	0.32 (0.22)
Rock bass	0.23 (0.10)	0.43 (0.27)	0.56 (0.22)	0.08 (0.08)	0.08 (0.08)	0.10 (0.07)
Green sunfish	0.06 (0.03)	0.16 (0.09)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Pumpkinseed	0.26 (0.14)	0.69 (0.41)	0.15 (0.15)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)
Warmouth	0.03 (0.02)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Orangespotted sunfish	0.28 (0.12)	0.45 (0.31)	0.16 (0.11)	0.08 (0.08)	0.00 (0.00)	0.26 (0.16)
Bluegill	7.03 (2.08)	9.67 (3.94)	13.66 (7.97)	2.39 (1.70)	0.07 (0.07)	6.64 (3.94)
Unidentified Lepomis	1.62 (0.58)	1.02 (0.52)	7.33 (4.80)	2.83 (2.11)	0.00 (0.00)	0.70 (0.36)
Smallmouth bass	0.09 (0.05)	0.00 (0.00)	1.07 (0.84)	0.08 (0.08)	0.00 (0.00)	0.05 (0.05)
Largemouth bass	0.13 (0.06)	0.04 (0.04)	1.14 (0.60)	0.24 (0.24)	0.00 (0.00)	0.00 (0.00)
White crappie	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Black crappie	1.60 (0.68)	1.32 (0.58)	7.69 (3.34)	3.08 (2.73)	0.00 (0.00)	0.16 (0.12)
Western sand darter	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)
Mud darter	0.07 (0.04)	0.16 (0.12)	0.33 (0.25)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)
Iowa darter	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Johnny darter	1.76 (0.67)	0.60 (0.26)	11.52 (6.97)	0.80 (0.64)	0.00 (0.00)	2.12 (1.45)
Yellow perch	0.36 (0.18)	0.08 (0.06)	1.75 (1.33)	0.81 (0.73)	0.00 (0.00)	0.16 (0.09)
Logperch	0.87 (0.22)	0.25 (0.17)	4.09 (3.02)	1.21 (0.49)	0.33 (0.22)	0.81 (0.29)
Slenderhead darter	0.04 (0.02)	0.00 (0.00)	0.00 (0.00)	0.16 (0.11)	0.00 (0.00)	0.00 (0.00)
River darter	0.65 (0.37)	0.00 (0.00)	0.74 (0.50)	0.00 (0.00)	0.16 (0.11)	1.61 (0.98)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 3

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Sauger	0.43 (0.17)	0.04 (0.04)	0.81 (0.38)	1.27 (0.69)	0.00 (0.00)	0.22 (0.13)
Walleye	0.10 (0.05)	0.00 (0.00)	0.16 (0.11)	0.33 (0.18)	0.00 (0.00)	0.06 (0.06)
Freshwater drum	0.41 (0.20)	0.00 (0.00)	3.78 (2.86)	0.89 (0.59)	0.31 (0.13)	0.05 (0.05)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO
Shortnose gar	0.01 (0.01)	0.09 (0.09)	0.00 (0.00)
Bowfin	0.01 (0.01)	0.09 (0.06)	0.00 (0.00)
Gizzard shad	0.03 (0.02)	0.21 (0.17)	0.00 (0.00)
Spotfin shiner	0.02 (0.01)	0.16 (0.09)	0.00 (0.00)
Common carp	0.56 (0.34)	1.33 (0.91)	0.45 (0.36)
Golden shiner	0.02 (0.01)	0.13 (0.09)	0.00 (0.00)
Emerald shiner	0.58 (0.54)	4.69 (4.40)	0.00 (0.00)
Spottail shiner	0.22 (0.10)	0.71 (0.40)	0.15 (0.10)
Weed shiner	0.01 (0.01)	0.08 (0.05)	0.00 (0.00)
Mimic shiner	0.03 (0.03)	0.27 (0.23)	0.00 (0.00)
Pugnose minnow	3.33 (3.09)	26.47 (25.12)	0.08 (0.08)
Bullhead minnow	0.43 (0.36)	2.94 (2.85)	0.08 (0.08)
Quillback	0.09 (0.07)	0.15 (0.15)	0.08 (0.08)
Smallmouth buffalo	0.32 (0.18)	0.43 (0.43)	0.30 (0.19)
Unidentified buffalo	0.21 (0.21)	0.00 (0.00)	0.23 (0.23)
Silver redhorse	0.15 (0.09)	0.12 (0.08)	0.15 (0.10)
Shorthead redhorse	0.21 (0.14)	0.04 (0.04)	0.23 (0.16)
Unidentified redhorse	0.57 (0.41)	0.20 (0.16)	0.62 (0.46)
Brown bullhead	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
Channel catfish	0.21 (0.14)	0.04 (0.04)	0.23 (0.16)
Tadpole madtom	0.33 (0.25)	0.00 (0.00)	0.37 (0.29)
Northern pike	0.01 (0.01)	0.09 (0.06)	0.00 (0.00)
Trout perch	0.01 (0.00)	0.04 (0.04)	0.00 (0.00)
Brook silverside	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
White bass	0.54 (0.47)	0.00 (0.00)	0.62 (0.54)
Rock bass	0.11 (0.07)	0.35 (0.19)	0.08 (0.08)
Pumpkinseed	0.05 (0.03)	0.39 (0.23)	0.00 (0.00)
Warmouth	0.02 (0.02)	0.17 (0.13)	0.00 (0.00)
Orangespotted sunfish	0.37 (0.32)	3.00 (2.57)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCO	IMPO
Bluegill	1.28 (0.69)	9.80 (5.55)	0.08 (0.08)
Unidentified Lepomis	0.46 (0.26)	3.70 (2.10)	0.00 (0.00)
Smallmouth bass	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
Largemouth bass	0.09 (0.06)	0.77 (0.47)	0.00 (0.00)
White crappie	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
Black crappie	0.28 (0.12)	1.73 (0.80)	0.08 (0.08)
Mud darter	0.01 (0.01)	0.08 (0.08)	0.00 (0.00)
Iowa darter	0.01 (0.01)	0.08 (0.08)	0.00 (0.00)
Johnny darter	1.31 (1.01)	0.68 (0.46)	1.39 (1.15)
Yellow perch	0.37 (0.26)	1.30 (1.26)	0.23 (0.23)
Logperch	1.16 (0.83)	3.27 (2.74)	0.86 (0.86)
Slenderhead darter	0.08 (0.07)	0.08 (0.08)	0.08 (0.08)
River darter	0.32 (0.28)	0.38 (0.38)	0.31 (0.31)
Sauger	1.28 (0.95)	1.04 (0.95)	1.32 (1.07)
Walleye	2.17 (1.74)	1.00 (0.91)	2.34 (1.98)
Freshwater drum	0.47 (0.26)	0.04 (0.04)	0.53 (0.29)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO	MCBU	MCBW	SCB
Common carp	0.13 (0.08)	0.00 (0.00)	0.20 (0.13)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Smallmouth buffalo	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Silver redhorse	0.02 (0.02)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Shorthead redhorse	0.10 (0.05)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.43 (0.23)
Channel catfish	0.72 (0.20)	0.41 (0.13)	0.16 (0.09)	1.80 (0.92)	1.90 (1.29)	2.02 (0.90)
Flathead catfish	0.02 (0.01)	0.00 (0.00)	0.00 (0.00)	0.20 (0.13)	0.18 (0.10)	0.00 (0.00)
Northern pike	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
White bass	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Rock bass	0.02 (0.01)	0.04 (0.04)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.08 (0.06)
Green sunfish	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Orangespotted sunfish	0.01 (0.01)	0.13 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Bluegill	0.22 (0.06)	0.84 (0.33)	0.04 (0.04)	0.04 (0.04)	0.09 (0.06)	0.62 (0.26)
Pumpkinseed x orangespotted sunfish	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
White crappie	0.01 (0.01)	0.13 (0.13)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Black crappie	0.08 (0.05)	0.00 (0.00)	0.12 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Yellow perch	0.04 (0.03)	0.45 (0.38)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Sauger	0.03 (0.03)	0.04 (0.04)	0.04 (0.04)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Walleye	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Freshwater drum	0.13 (0.05)	0.00 (0.00)	0.12 (0.06)	0.21 (0.17)	0.05 (0.05)	0.17 (0.09)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO	MCBU	MCBW	SCB
Shovelnose sturgeon	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Longnose gar	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Shortnose gar	0.01 (0.00)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Bowfin	0.01 (0.01)	0.13 (0.13)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Common carp	0.24 (0.18)	0.29 (0.17)	0.29 (0.29)	0.00 (0.00)	0.00 (0.00)	0.17 (0.09)
River carpsucker	0.01 (0.01)	0.12 (0.12)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.19 (0.07)	0.08 (0.06)	0.08 (0.06)	0.32 (0.16)	1.48 (1.03)	0.49 (0.34)
Spotted sucker	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Silver redhorse	0.59 (0.23)	0.04 (0.04)	0.86 (0.38)	0.21 (0.09)	0.04 (0.04)	0.17 (0.13)
Golden redhorse	0.04 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.09 (0.06)
Shorthead redhorse	0.93 (0.31)	0.17 (0.09)	1.14 (0.49)	0.85 (0.61)	0.40 (0.31)	0.64 (0.31)
Black bullhead	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Brown bullhead	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Channel catfish	1.32 (0.38)	0.88 (0.36)	1.00 (0.52)	0.98 (0.53)	1.58 (0.67)	2.80 (1.05)
Flathead catfish	0.13 (0.06)	0.04 (0.04)	0.04 (0.04)	0.69 (0.48)	0.27 (0.18)	0.12 (0.09)
Northern pike	0.06 (0.03)	0.17 (0.07)	0.08 (0.05)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
White bass	0.05 (0.03)	0.08 (0.08)	0.04 (0.04)	0.12 (0.09)	0.09 (0.09)	0.00 (0.00)
Rock bass	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Pumpkinseed	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Bluegill	0.41 (0.16)	2.05 (1.22)	0.08 (0.08)	0.08 (0.08)	0.68 (0.30)	0.94 (0.57)
Smallmouth bass	0.05 (0.03)	0.00 (0.00)	0.08 (0.05)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Largemouth bass	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
White crappie	0.02 (0.02)	0.21 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Black crappie	0.13 (0.04)	0.79 (0.25)	0.04 (0.04)	0.00 (0.00)	0.23 (0.18)	0.21 (0.10)
Yellow perch	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Sauger	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Walleye	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Freshwater drum	0.41 (0.14)	0.00 (0.00)	0.50 (0.21)	0.62 (0.28)	0.72 (0.31)	0.16 (0.12)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	SCB
Longnose gar	0.09 (0.05)	0.00 (0.00)	0.08 (0.06)	0.17 (0.11)
Shortnose gar	0.04 (0.03)	0.08 (0.08)	0.04 (0.04)	0.00 (0.00)
Gizzard shad	0.08 (0.07)	0.00 (0.00)	0.04 (0.04)	0.17 (0.17)
Spotfin shiner	39.73 (15.27)	7.92 (4.47)	75.96 (32.89)	46.42 (32.52)
Common carp	0.21 (0.09)	0.42 (0.23)	0.13 (0.13)	0.08 (0.08)
Golden shiner	0.13 (0.06)	0.25 (0.13)	0.04 (0.04)	0.08 (0.08)
Emerald shiner	30.52 (8.06)	11.92 (7.77)	97.17 (31.12)	6.92 (2.75)
River shiner	18.20 (7.04)	0.00 (0.00)	69.13 (28.84)	3.75 (3.05)
Spottail shiner	1.30 (0.79)	2.08 (2.08)	1.46 (0.75)	0.50 (0.50)
Sand shiner	0.05 (0.03)	0.00 (0.00)	0.21 (0.12)	0.00 (0.00)
Weed shiner	0.30 (0.19)	0.00 (0.00)	0.13 (0.13)	0.67 (0.47)
Mimic shiner	11.82 (4.24)	1.58 (1.32)	43.42 (17.44)	1.92 (0.96)
Pugnose minnow	1.30 (0.72)	0.50 (0.36)	0.08 (0.08)	2.75 (1.78)
Fathead minnow	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)
Bullhead minnow	7.16 (2.17)	7.08 (4.79)	10.71 (4.36)	5.08 (2.04)
Unidentified minnow	0.09 (0.08)	0.00 (0.00)	0.38 (0.33)	0.00 (0.00)
Quillback	8.57 (8.40)	0.08 (0.08)	0.08 (0.06)	21.33 (21.06)
Unidentified carpsucker	5.12 (5.12)	0.00 (0.00)	0.00 (0.00)	12.83 (12.83)
Unidentified buffalo	0.07 (0.07)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)
Silver redhorse	0.48 (0.26)	0.25 (0.25)	0.08 (0.06)	0.92 (0.62)
Shorthead redhorse	0.08 (0.07)	0.00 (0.00)	0.04 (0.04)	0.17 (0.17)
Unidentified redhorse	1.44 (0.73)	2.58 (1.86)	0.04 (0.04)	1.25 (0.76)
Tadpole madtom	0.45 (0.15)	0.83 (0.37)	0.08 (0.06)	0.33 (0.19)
Northern pike	0.13 (0.08)	0.17 (0.11)	0.00 (0.00)	0.17 (0.17)
Brook silverside	5.84 (2.15)	6.67 (3.19)	3.25 (2.58)	6.67 (4.31)
White bass	0.27 (0.10)	0.08 (0.08)	0.58 (0.29)	0.25 (0.18)
Rock bass	1.47 (0.64)	1.00 (0.51)	0.04 (0.04)	2.75 (1.54)
Green sunfish	0.60 (0.43)	0.75 (0.75)	0.00 (0.00)	0.83 (0.83)
Pumpkinseed	0.63 (0.56)	0.00 (0.00)	0.00 (0.00)	1.58 (1.41)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MC BU - Main channel border, unstructured

Table 2.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 2.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	SCB
Orangespotted sunfish	2.14 (1.44)	0.00 (0.00)	0.04 (0.04)	5.33 (3.61)
Bluegill	10.31 (5.33)	4.00 (1.72)	1.33 (1.29)	21.42 (13.26)
Unidentified Lepomis	1.89 (0.93)	2.00 (1.74)	0.58 (0.54)	2.58 (1.71)
Smallmouth bass	0.22 (0.11)	0.25 (0.25)	0.25 (0.14)	0.17 (0.11)
Largemouth bass	0.34 (0.12)	0.33 (0.19)	0.08 (0.06)	0.50 (0.26)
Black crappie	0.19 (0.09)	0.17 (0.11)	0.00 (0.00)	0.33 (0.19)
Western sand darter	0.22 (0.11)	0.00 (0.00)	0.38 (0.22)	0.33 (0.26)
Mud darter	0.23 (0.11)	0.58 (0.29)	0.08 (0.08)	0.00 (0.00)
Johnny darter	1.76 (0.64)	1.92 (1.30)	1.13 (0.75)	2.00 (1.01)
Yellow perch	0.14 (0.10)	0.00 (0.00)	0.04 (0.04)	0.33 (0.26)
Logperch	1.31 (0.49)	0.50 (0.50)	0.83 (0.36)	2.33 (1.12)
Slenderhead darter	0.13 (0.08)	0.00 (0.00)	0.42 (0.30)	0.08 (0.08)
River darter	0.69 (0.35)	0.50 (0.50)	0.33 (0.18)	1.08 (0.75)
Sauger	0.14 (0.08)	0.00 (0.00)	0.17 (0.10)	0.25 (0.18)
Walleye	0.11 (0.07)	0.17 (0.17)	0.08 (0.08)	0.08 (0.08)
Freshwater drum	0.06 (0.04)	0.00 (0.00)	0.13 (0.07)	0.08 (0.08)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	BWCS
Longnose gar	0.05 (0.05)
Bowfin	0.50 (0.18)
Gizzard shad	1.58 (0.91)
Spotfin shiner	21.44 (12.22)
Common carp	0.54 (0.31)
Golden shiner	0.79 (0.29)
Emerald shiner	42.22 (34.78)
River shiner	1.34 (1.06)
Spottail shiner	5.21 (2.61)
Weed shiner	0.72 (0.49)
Mimic shiner	32.53 (21.99)
Pugnose minnow	2.41 (0.80)
Bullhead minnow	11.43 (5.40)
River carpsucker	0.20 (0.20)
Quillback	0.40 (0.40)
Highfin carpsucker	0.06 (0.06)
Bigmouth buffalo	0.06 (0.06)
Spotted sucker	3.66 (1.02)
Silver redhorse	1.10 (0.46)
Golden redhorse	0.68 (0.17)
Shorthead redhorse	2.50 (0.69)
Unidentified redhorse	1.20 (1.20)
Brown bullhead	0.06 (0.06)
Channel catfish	0.06 (0.06)
Tadpole madtom	0.06 (0.06)
Flathead catfish	0.11 (0.07)
Northern pike	1.78 (0.43)
Brook silverside	0.66 (0.43)
White bass	1.73 (1.07)
Rock bass	2.10 (0.61)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	BWCS
Green sunfish	0.42 (0.16)
Pumpkinseed	1.89 (0.66)
Orangespotted sunfish	2.15 (1.38)
Bluegill	73.19 (22.75)
Unidentified Lepomis	0.27 (0.19)
Smallmouth bass	2.37 (0.53)
Largemouth bass	11.91 (3.32)
White crappie	0.12 (0.08)
Black crappie	2.14 (1.05)
Mud darter	0.28 (0.18)
Iowa darter	0.11 (0.11)
Johnny darter	13.81 (9.26)
Yellow perch	17.98 (4.55)
Logperch	11.34 (4.08)
River darter	1.19 (0.73)
Sauger	3.10 (0.56)
Walleye	1.81 (0.45)
Freshwater drum	0.93 (0.55)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Chestnut lamprey	0.05 (0.05)
Silver lamprey	0.04 (0.04)
Longnose gar	0.43 (0.31)
Shortnose gar	0.16 (0.12)
Bowfin	0.10 (0.07)
Goldeye	0.06 (0.06)
Mooneye	1.16 (0.62)
Gizzard shad	8.57 (3.65)
Spotfin shiner	1.14 (0.66)
Common carp	1.73 (0.59)
Golden shiner	0.10 (0.07)
Emerald shiner	21.67 (15.61)
River shiner	3.76 (2.95)
Spottail shiner	1.38 (0.77)
Mimic shiner	5.42 (2.48)
Fathead minnow	0.04 (0.04)
Bullhead minnow	0.84 (0.50)
River carpsucker	0.68 (0.45)
Quillback	1.71 (0.51)
Highfin carpsucker	0.14 (0.14)
White sucker	0.09 (0.06)
Northern hog sucker	0.05 (0.05)
Smallmouth buffalo	0.53 (0.41)
Bigmouth buffalo	0.04 (0.04)
Spotted sucker	0.83 (0.31)
Silver redhorse	5.16 (1.45)
River redhorse	0.46 (0.29)
Golden redhorse	2.65 (1.20)
Shorthead redhorse	13.74 (2.67)
Unidentified redhorse	0.10 (0.07)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	TWZ
Channel catfish	0.75 (0.30)
Tadpole madtom	0.09 (0.06)
Flathead catfish	0.36 (0.14)
Northern pike	1.01 (0.20)
Burbot	0.04 (0.04)
Brook silverside	1.29 (0.64)
White bass	93.78 (34.74)
Yellow bass	0.11 (0.11)
Rock bass	2.70 (1.10)
Green sunfish	0.20 (0.11)
Pumpkinseed	0.04 (0.04)
Orangespotted sunfish	0.31 (0.26)
Bluegill	19.60 (3.24)
Smallmouth bass	10.91 (2.86)
Largemouth bass	4.07 (0.90)
White crappie	0.23 (0.13)
Black crappie	1.30 (0.45)
Western sand darter	1.75 (1.52)
Mud darter	0.05 (0.05)
Johnny darter	0.11 (0.07)
Yellow perch	2.53 (1.25)
Logperch	2.85 (1.45)
Slenderhead darter	0.36 (0.16)
River darter	0.62 (0.24)
Sauger	62.57 (13.46)
Walleye	6.45 (1.27)
Freshwater drum	7.73 (2.70)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	BWCS
Longnose gar	2.43 (2.00)
Shortnose gar	1.19 (0.51)
Bowfin	0.40 (0.22)
Gizzard shad	1.40 (1.16)
Common carp	1.04 (0.42)
Golden shiner	0.47 (0.22)
White sucker	0.15 (0.10)
Spotted sucker	0.63 (0.26)
Silver redhorse	1.77 (0.68)
Golden redhorse	0.08 (0.08)
Shorthead redhorse	1.04 (0.41)
Black bullhead	0.08 (0.08)
Channel catfish	0.39 (0.18)
Flathead catfish	0.63 (0.33)
Northern pike	1.35 (0.38)
White bass	10.07 (8.68)
Rock bass	0.31 (0.18)
Green sunfish	0.23 (0.17)
Pumpkinseed	2.64 (1.00)
Orangespotted sunfish	0.08 (0.08)
Bluegill	60.94 (12.16)
Green x pumpkinseed sunfish	0.08 (0.08)
Pumpkinseed x orangespotted sunfish	0.08 (0.08)
Largemouth bass	1.33 (0.78)
White crappie	0.39 (0.32)
Black crappie	22.27 (4.40)
Yellow perch	7.76 (1.74)
Sauger	0.57 (0.35)
Walleye	0.23 (0.17)
Freshwater drum	1.63 (1.46)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Gizzard shad	0.34 (0.34)
Spotfin shiner	11.66 (7.37)
Common carp	0.17 (0.17)
Emerald shiner	8.17 (6.43)
River shiner	25.99 (20.01)
Spottail shiner	32.16 (29.79)
Sand shiner	0.17 (0.17)
Weed shiner	0.17 (0.17)
Mimic shiner	12.85 (6.13)
Pugnose minnow	0.17 (0.17)
Bullhead minnow	3.67 (1.74)
Unidentified minnow	0.17 (0.17)
White sucker	0.17 (0.17)
Burbot	0.17 (0.17)
Brook silverside	0.66 (0.49)
White bass	1.51 (0.97)
Green sunfish	0.16 (0.16)
Pumpkinseed	0.17 (0.17)
Orangespotted sunfish	0.50 (0.34)
Bluegill	2.19 (1.34)
Unidentified Lepomis	0.16 (0.16)
Smallmouth bass	0.31 (0.31)
Largemouth bass	0.66 (0.33)
Black crappie	0.96 (0.65)
Yellow perch	0.17 (0.17)
Logperch	2.27 (1.18)
River darter	0.63 (0.46)
Sauger	1.00 (0.37)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Smallmouth buffalo	0.08 (0.08)
Shorthead redhorse	0.49 (0.40)
Channel catfish	24.12 (23.62)
Flathead catfish	0.08 (0.08)
White bass	0.08 (0.08)
Rock bass	0.08 (0.08)
Bluegill	0.17 (0.11)
Sauger	0.08 (0.08)
Freshwater drum	0.16 (0.10)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Common carp	0.33 (0.24)
Smallmouth buffalo	0.50 (0.26)
Shorthead redhorse	0.65 (0.39)
Channel catfish	0.58 (0.33)
Flathead catfish	1.07 (0.41)
White bass	0.17 (0.17)
Smallmouth bass	0.08 (0.08)
Black crappie	0.33 (0.24)
Freshwater drum	1.73 (0.90)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 2.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	BWCS	TWZ
Longnose gar	0.08 (0.08)	0.00 (0.00)
Bowfin	0.08 (0.08)	0.08 (0.08)
Gizzard shad	0.42 (0.26)	2.00 (1.74)
Spotfin shiner	76.67 (48.18)	49.50 (43.38)
Common carp	0.08 (0.08)	0.00 (0.00)
Emerald shiner	230.08 (173.65)	128.50 (94.25)
River shiner	6.50 (6.32)	40.17 (34.37)
Spottail shiner	20.58 (13.48)	0.50 (0.34)
Sand shiner	0.00 (0.00)	0.50 (0.50)
Weed shiner	0.67 (0.50)	0.00 (0.00)
Mimic shiner	72.75 (50.55)	263.00 (253.77)
Pugnose minnow	10.33 (5.77)	0.00 (0.00)
Bullhead minnow	9.42 (4.33)	19.75 (17.17)
Unidentified minnow	0.08 (0.08)	0.00 (0.00)
Quillback	1.08 (1.08)	0.17 (0.11)
Unidentified carpsucker	4.75 (4.75)	0.17 (0.17)
Unidentified buffalo	0.67 (0.67)	0.00 (0.00)
Silver redhorse	0.75 (0.66)	0.00 (0.00)
Shorthead redhorse	0.17 (0.11)	0.00 (0.00)
Unidentified redhorse	13.58 (13.04)	0.17 (0.11)
Tadpole madtom	0.42 (0.19)	0.00 (0.00)
Northern pike	0.25 (0.25)	0.00 (0.00)
Trout perch	0.00 (0.00)	0.08 (0.08)
Brook silverside	22.75 (13.89)	3.58 (2.27)
White bass	0.58 (0.58)	0.42 (0.23)
Rock bass	0.83 (0.67)	0.25 (0.18)
Pumpkinseed	0.33 (0.26)	0.00 (0.00)
Orangespotted sunfish	3.83 (3.65)	0.00 (0.00)
Bluegill	57.83 (31.52)	2.50 (1.04)
Unidentified Lepomis	30.33 (19.51)	0.17 (0.17)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	BWCS	TWZ
Smallmouth bass	1.50 (0.92)	0.00 (0.00)
Largemouth bass	1.67 (0.51)	0.17 (0.11)
White crappie	0.25 (0.25)	0.00 (0.00)
Black crappie	3.83 (2.23)	0.00 (0.00)
Unidentified sunfish	0.17 (0.17)	0.00 (0.00)
Western sand darter	0.00 (0.00)	0.50 (0.29)
Mud darter	0.92 (0.36)	0.00 (0.00)
Iowa darter	0.25 (0.25)	0.00 (0.00)
Johnny darter	34.50 (29.77)	0.83 (0.51)
Yellow perch	12.08 (10.38)	0.25 (0.13)
Logperch	38.75 (25.62)	1.08 (0.42)
Slenderhead darter	0.00 (0.00)	0.17 (0.11)
River darter	1.83 (1.13)	1.33 (0.54)
Sauger	0.33 (0.33)	0.08 (0.08)
Walleye	0.75 (0.59)	0.00 (0.00)
Freshwater drum	0.08 (0.08)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 2.4.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 8 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Common carp	0.17 (0.17)
Silver redhorse	0.08 (0.08)
Shorthead redhorse	0.33 (0.22)
Channel catfish	0.92 (0.74)
Flathead catfish	0.08 (0.08)
Crystal darter	0.08 (0.08)
Sauger	0.25 (0.13)
Freshwater drum	3.25 (2.64)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

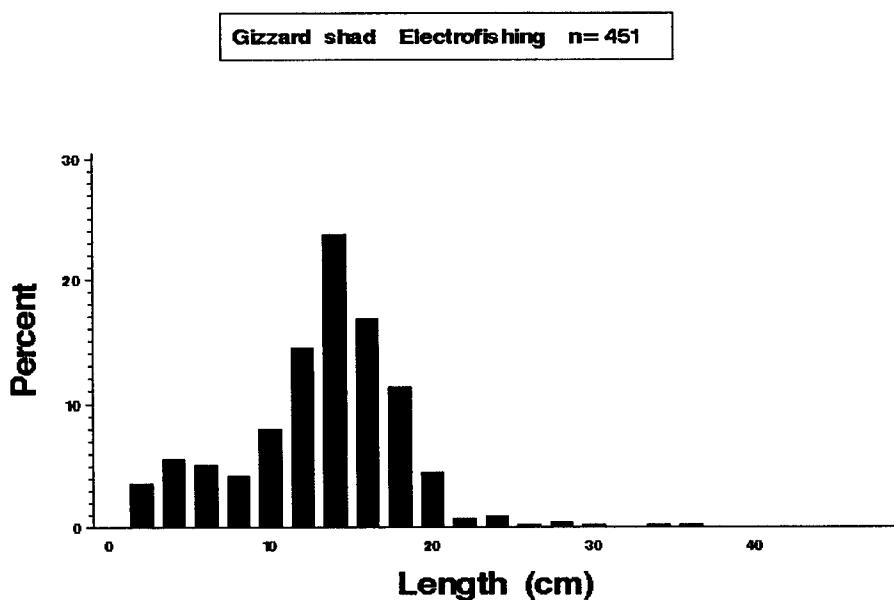


Figure 2.2. Length distributions (length) as a percentage of catch (percent) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

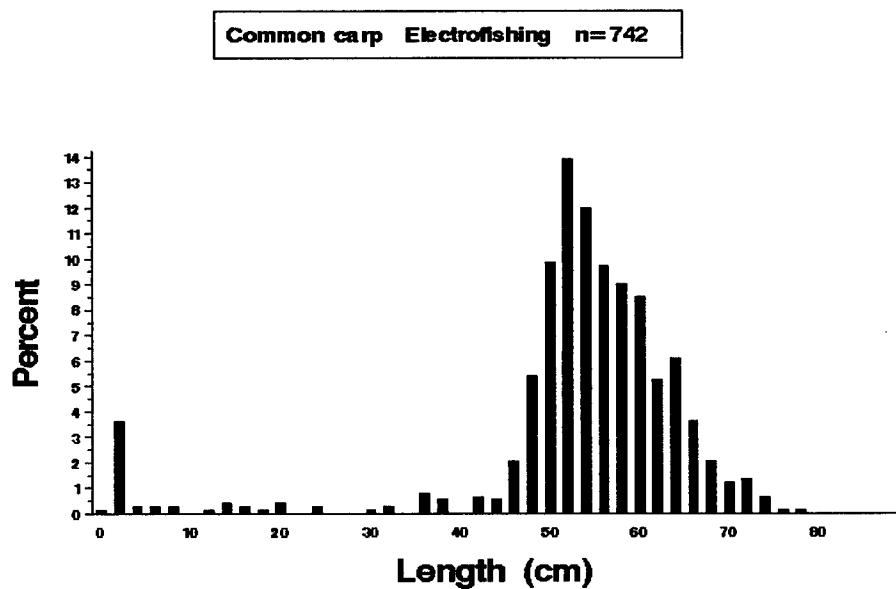


Figure 2.3. Length distributions (length) as a percentage of catch (percent) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

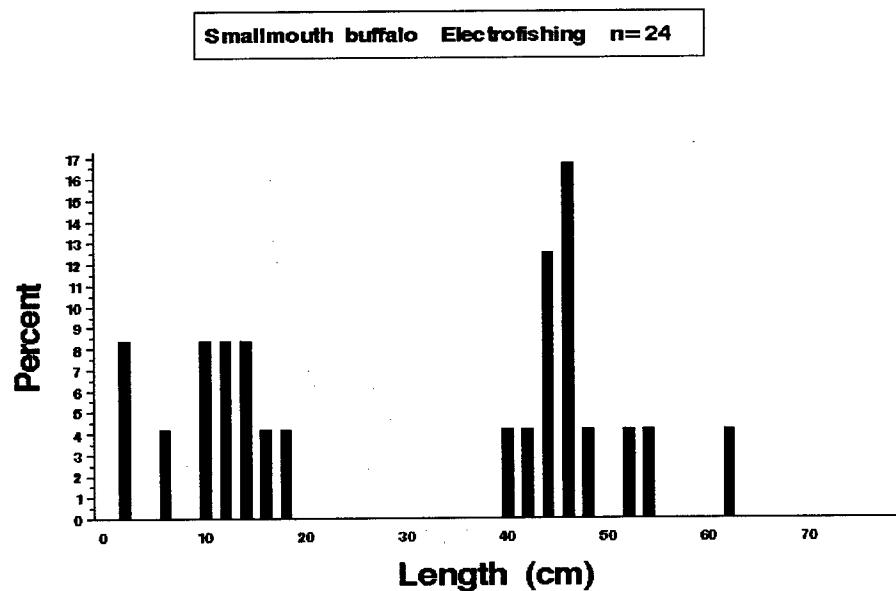


Figure 2.4. Length distributions (length) as a percentage of catch (percent) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

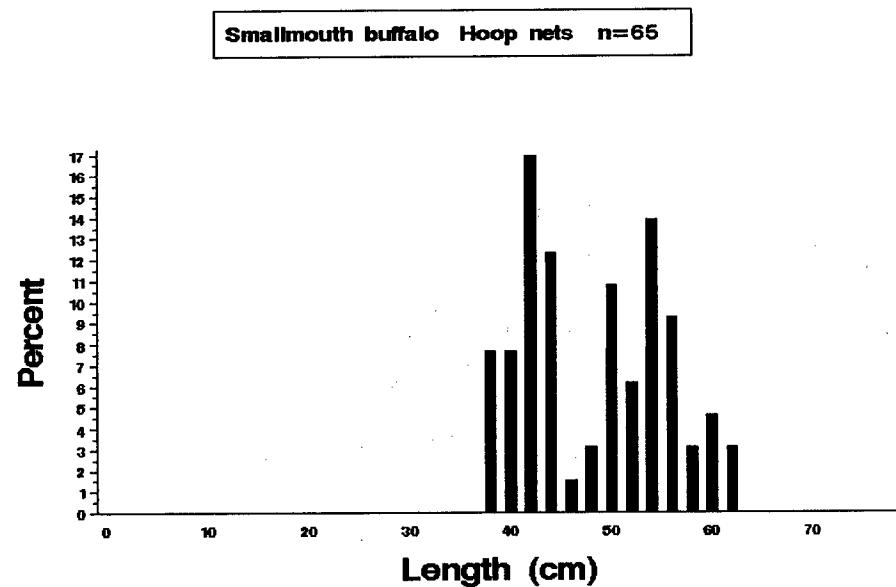


Figure 2.5. Length distributions (length) as a percentage of catch (percent) for smallmouth buffalo (*Ictiobus bubalus*) collected by small and large hoop netting in Upper Mississippi River Pool 8 during 1998.

Channel catfish Electrofishing n=48

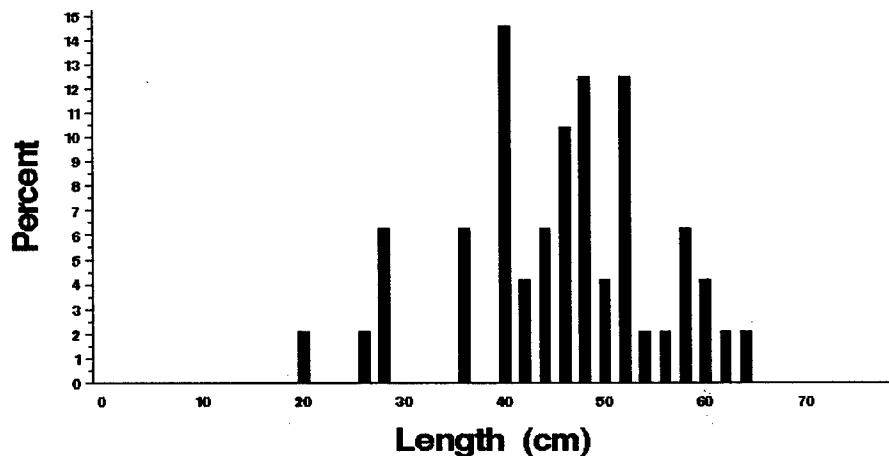


Figure 2.6. Length distributions (length) as a percentage of catch (percent) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

Channel catfish Hoop nets n=625

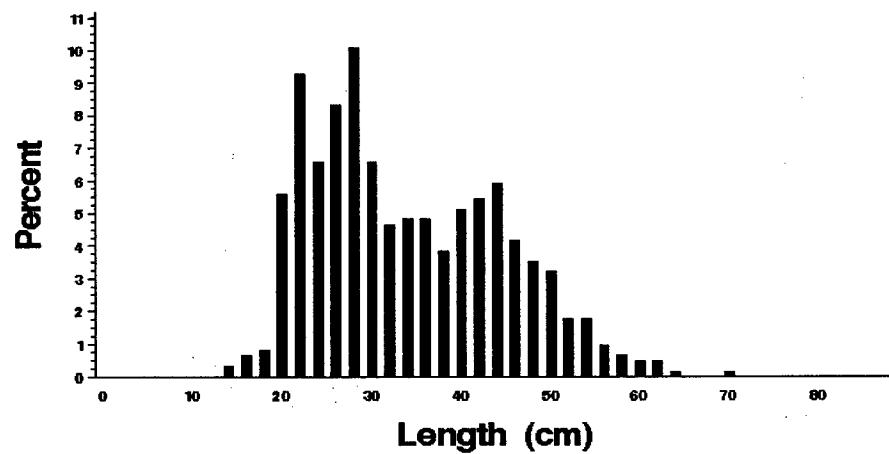


Figure 2.7. Length distributions (length) as a percentage of catch (percent) for channel catfish (*Ictalurus punctatus*) collected by small and large hoop netting in Upper Mississippi River Pool 8 during 1998.

Northern pike Electrofishing n= 103

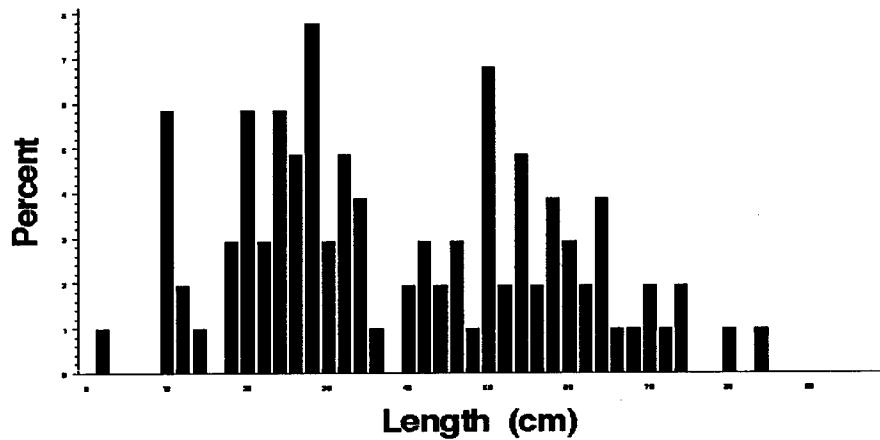


Figure 2.8. Length distributions (length) as a percentage of catch (percent) for northern pike (*Esox lucius*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

Northern pike Fyke nets n= 69

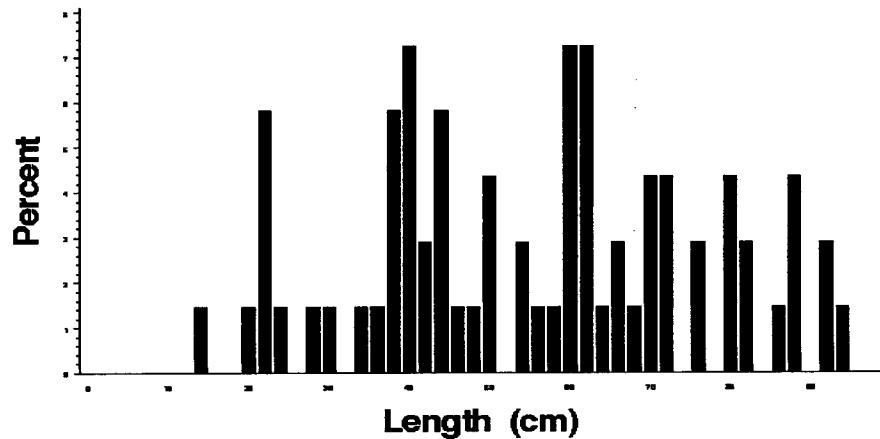


Figure 2.9. Length distributions (length) as a percentage of catch (percent) for northern pike (*Esox lucius*) collected by fyke netting in Upper Mississippi River Pool 8 during 1998.

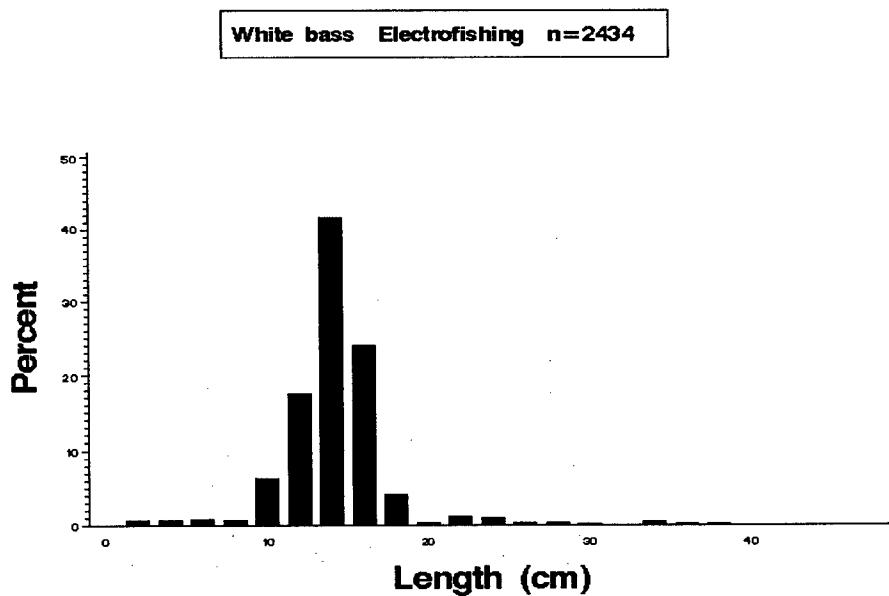


Figure 2.10. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

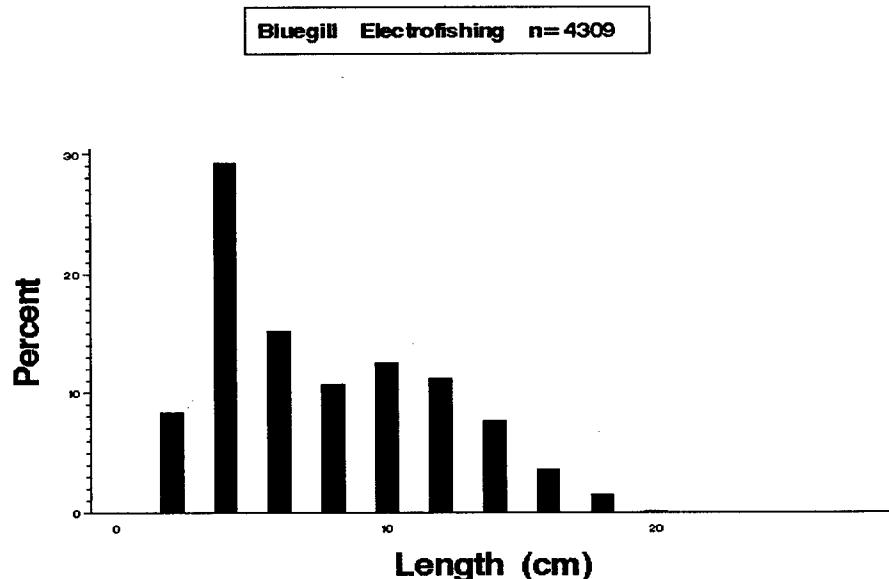


Figure 2.11. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

Bluegill Fyke nets n=2848

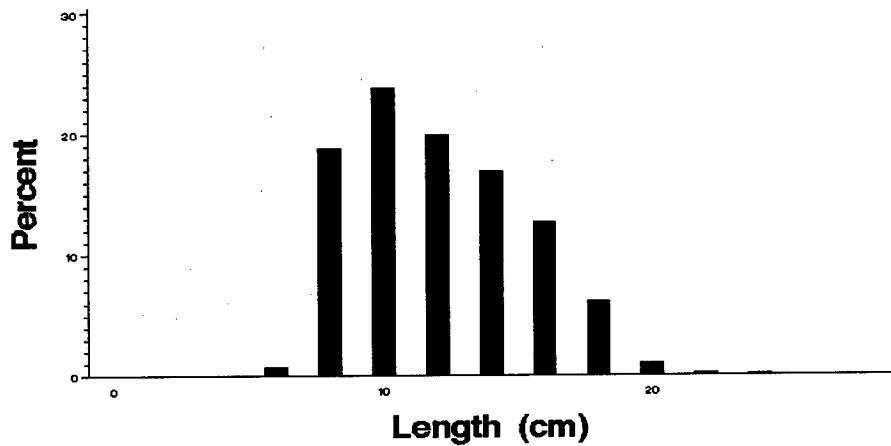


Figure 2.12. Length distributions (length) as a percentage of catch (percent) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 8 during 1998.

Largemouth bass Electrofishing n=636

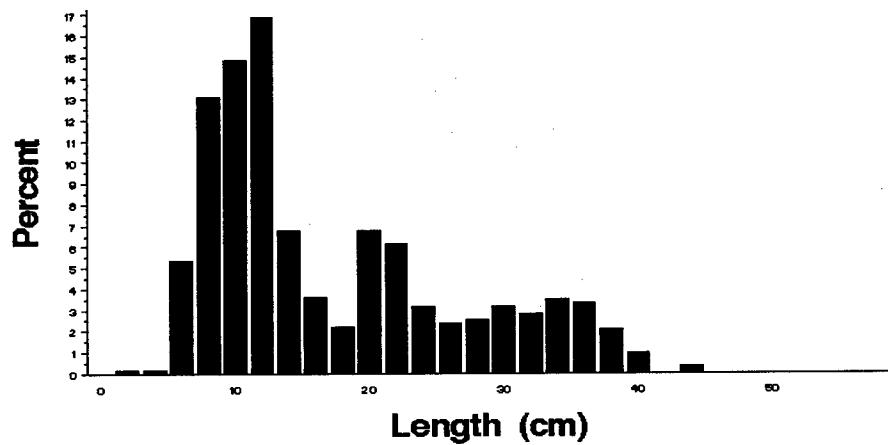


Figure 2.13. Length distributions (length) as a percentage of catch (percent) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

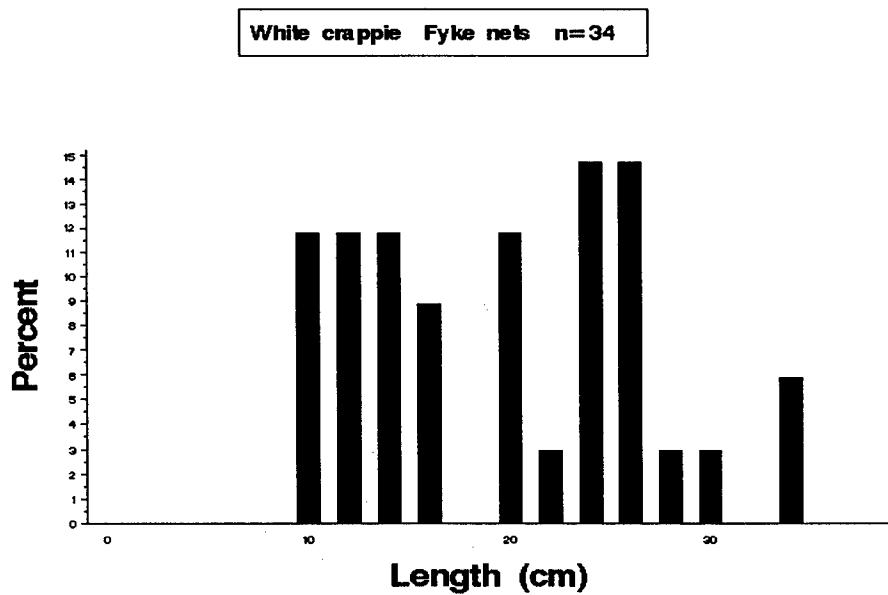


Figure 2.14. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularis*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

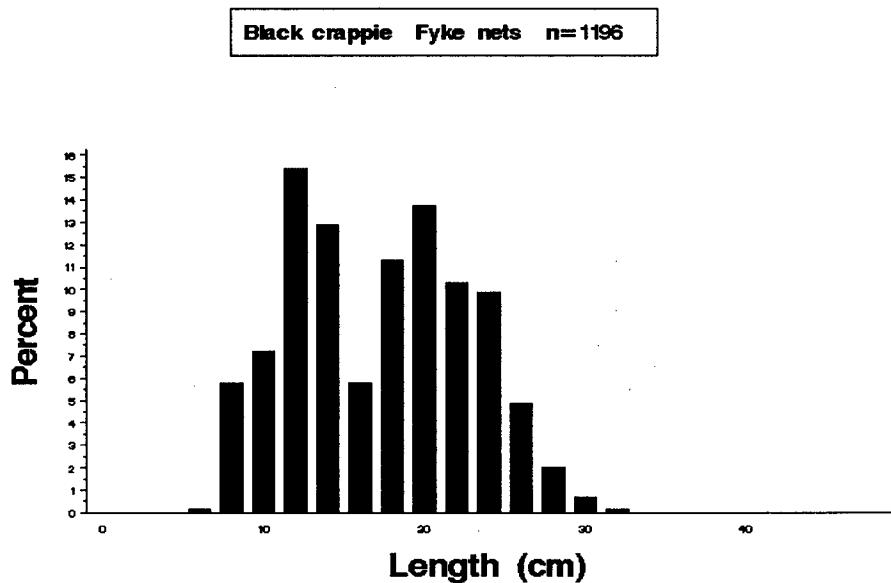


Figure 2.15. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

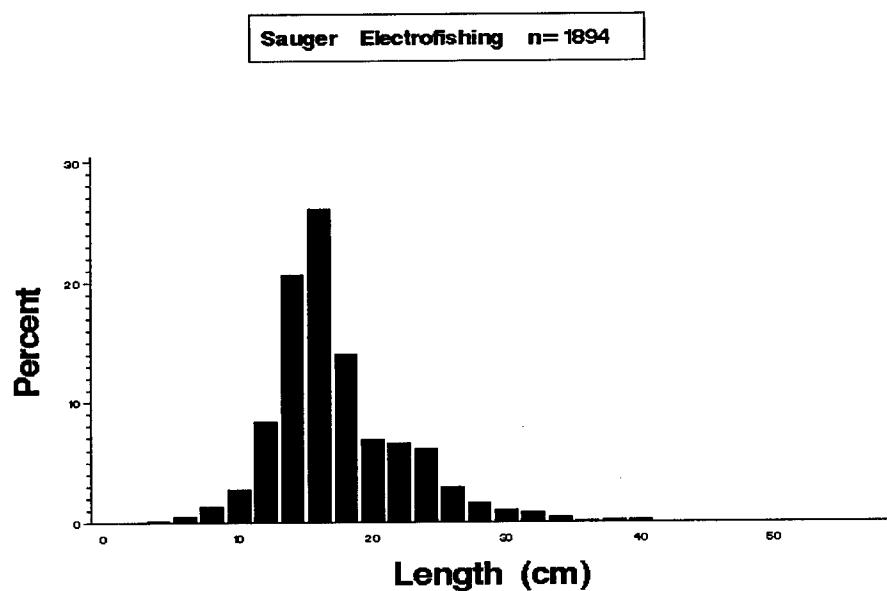


Figure 2.16. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

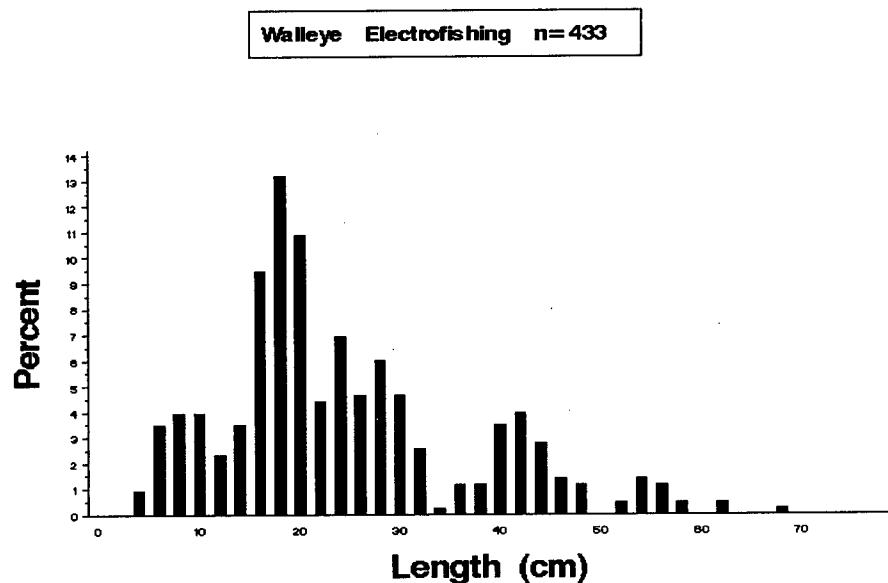


Figure 2.17. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

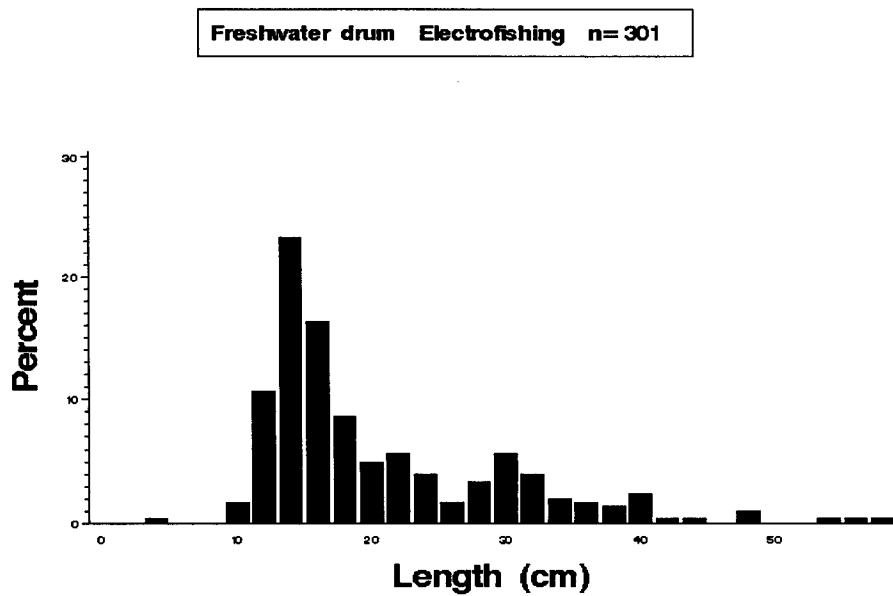


Figure 2.18. Length distributions (length) as a percentage of catch (percent) for freshwater drum (*Aplochiton grunniens*) collected by electrofishing in Upper Mississippi River Pool 8 during 1998.

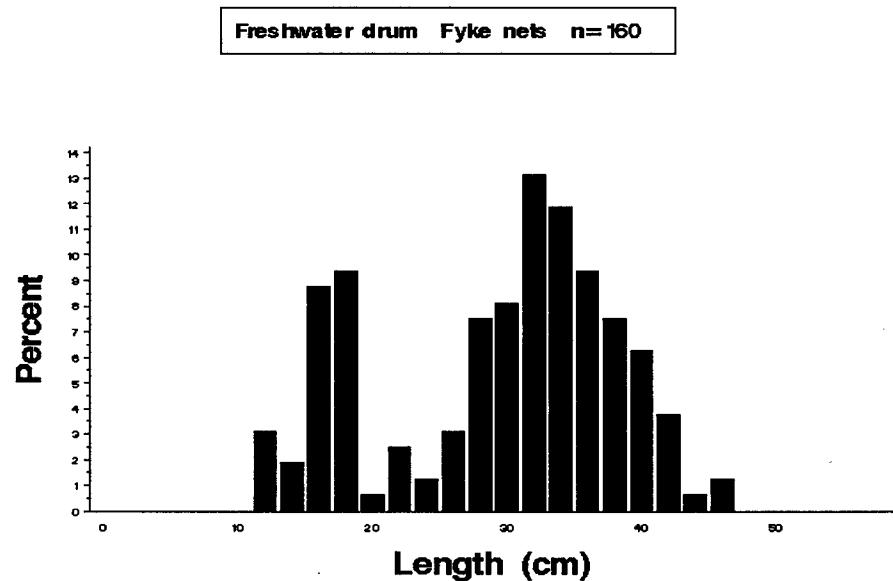


Figure 2.19. Length distributions (length) as a percentage of catch (percent) for freshwater drum (*Aplochiton grunniens*) collected by fyke netting in Upper Mississippi River Pool 8 during 1998.

Chapter 3. Pool 13, Upper Mississippi River

by

Melvin C. Bowler

Iowa Department of Natural Resources
LTRMP Mississippi River Monitoring Field Station
206 Rose Street
Bellevue, Iowa 52031

Hydrograph

Water levels throughout the sampling period followed the 57-year mean at the Lock and Dam 12 tailwater gage (Figure 3.1). Highest water levels were encountered starting in the second week of the first period and extended throughout the period. Lowest sustained water levels occurred for most of the third period. Water levels did not affect sampling effort in 1998. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

Summary of Sampling Effort

Fish populations were sampled in Pool 13 during 1998 using 10 gear types, which were deployed among eight strata types. A total of 486 samples (162 per period) were allocated during the three periods and all were completed. Sampling effort was uniform among all three periods. In each period, 162 samples were completed (Table 3.1). Of the 486 samples collected, 438 were at stratified random sites and 48 were at tailwater fixed sites.

Total Catch by Gear

A total of 53,189 fish were collected represented by 65 species, 2 centrarchid hybrids, 1 morone hybrid, and 132 unidentified species. Unidentified species included 30 unidentified buffalo (*Ictiobus* sp. <15.0 cm), 99 unidentified redhorse (*Moxostoma* sp.), and 3 unidentified sucker (Catostomidae sp.). The top five species collected with all gears combined were the channel shiner (18,111), bluegill (7,710), river shiner (6,926), emerald shiner (4,112), and gizzard shad (3,278).

Numerical catch of fish collected and the associated number of species collected by various gears are as follows: 7,159 fish (55 species) by day electrofishing, 4,582 fish (47 species) by night electrofishing, 1,214 fish (29 species) by fyke netting, 941 fish (28 species) by tandem fyke netting, 8,393 fish (44 species) by mini fyke netting, 2,219 fish (31 species) by tandem mini fyke netting, 27,618 fish (42 species) by seining, 295 fish (14 species) by small hoop netting, 480 fish (17 species) by large hoop netting, and 288 fish (11 species) by trawling (Table 3.2).

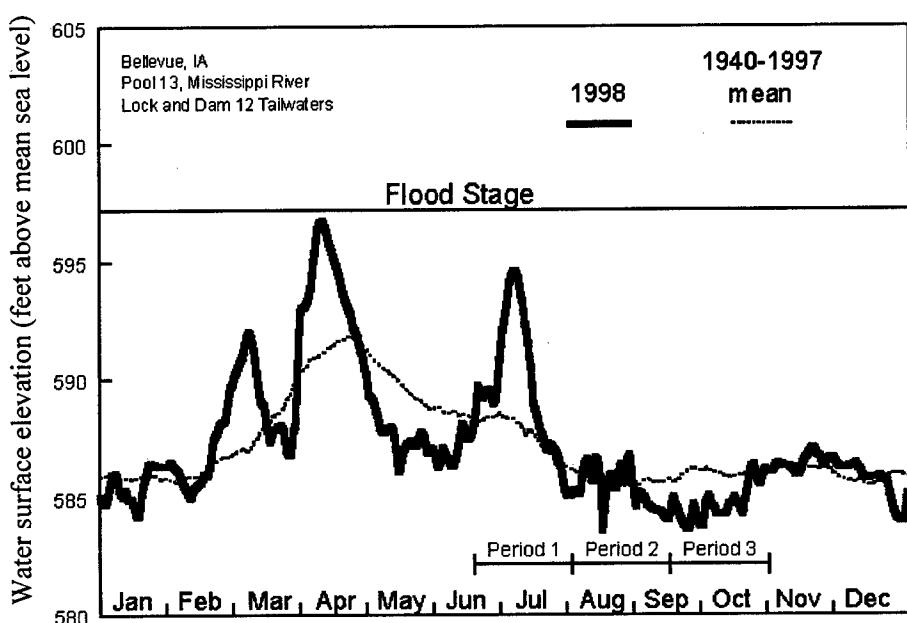


Figure 3.1. Daily water surface elevation from Lock and Dam 12 for Pool 13, Upper Mississippi River, during 1998 and mean elevation since 1940. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

No federally endangered fishes were collected in 1998, however 1 lake sturgeon and 1 bluntnose darter were collected. These fish are listed as endangered species in Iowa. One chestnut lamprey and 2 western sand darters were collected. These fish are listed as threatened species in Iowa. Also, 98 pugnose minnows were collected—this species is listed as being of special concern in Iowa. Other notable species collected were 3 fathead minnows, 10 quillback, 1 white sucker, 4 black buffalo, 7 silver redhorse, 3 stonecat, 6 green sunfish, 68 smallmouth bass, and 4 slenderhead darters. These species are listed as uncommon, rare, or tributary strays in Pool 13 by Pitlo et al. (1995) and are infrequently encountered in Long Term Resource Monitoring sampling.

Two new species were sampled in 1998, making a cumulative total of 76 species collected to date. One bluntnose darter was collected by day electrofishing in a BWCS stratum. This species has not been documented in the state of Iowa since 1975. One fantail darter was collected by seining in a IMPS stratum. Also, the first specimen of wiper (*Morone saxatilis* × *M. chrysops*) was sampled this year by day electrofishing in a BWCS stratum.

Random Sampling, Mean C/f by Gear and Stratum

Mean catch-per-unit-effort (C/f) of dominant fish species for random sampling by gear type and stratum is listed in Tables 3.3.1 to 3.3.9.

Day Electrofishing

Day electrofishing C/f (fish per 15 min) was highest for bluegills and gizzard shad (45.50) in the BWCS stratum, emerald shiners (12.08) in the IMPS stratum, emerald shiners (33.25) in the MCBU stratum, emerald shiners (56.22) in the MCBW stratum, emerald shiners (25.33) in the SCB stratum, and gizzard shad (26.22) for all strata combined (Table 3.3.1).

Night Electrofishing

Night electrofishing C/f (fish per 15 min) was highest for bluegills (65.83) in the BWCS stratum, white bass (18.00) in the MCBU stratum, bluegills (25.17) in the SCB stratum, and bluegills (34.13) for all strata combined (Table 3.3.2).

Fyke Net

Fyke netting C/f (fish per net-day) was highest for bluegills (15.29) in the BWCS stratum, gizzard shad (7.83) in the IMPS stratum, and bluegills (14.41) for all strata combined (Table 3.3.3).

Tandem Fyke Net

Tandem fyke netting C/f (fish per net-day) was highest for bluegills (8.84) in the BWCO stratum, bluegills (1.63) in the IMPO stratum, and bluegills (4.29) for all strata combined (Table 3.3.4).

Mini Fyke Net

Mini fyke netting C/f (fish per net-day) was highest for bluegills (9.92) in the BWCS stratum, channel shiners (15.86) in the IMPS stratum, channel shiners (28.41) in the MCBU stratum, bluegills (29.22) in the MCBW stratum, channel shiners (59.52) in the SCB stratum, and channel shiners (28.23) for all strata combined (Table 3.3.5).

Tandem Mini Fyke Net

Tandem mini fyke netting C/f (fish per net-day) was highest for bluegills (16.76) in the BWCO stratum, channel shiners (11.68) in the IMPO stratum, and channel shiners (12.79) for all strata combined (Table 3.3.6).

Small Hoop Net

Small hoop netting C/f (fish per net-day) was highest for channel catfish (1.04) in the IMPO stratum, channel catfish (2.98) in the MCBU stratum, channel catfish (1.86) in the MCBW stratum, channel catfish (1.93) in the SCB stratum, and channel catfish (1.69) for all strata combined (Table 3.3.7).

Large Hoop Net

Large hoop netting C/f (fish per net-day) was highest for freshwater drum (0.53) in the IMPO stratum, smallmouth buffalo (1.25) in the MCBU stratum, smallmouth buffalo (5.37) in the MCBW stratum, smallmouth buffalo (2.32) in the SCB stratum, and smallmouth buffalo (0.83) for all strata combined (Table 3.3.8).

Seine

Seining C/f (fish per haul) was highest for channel shiners (97.78) in the BWCS stratum, channel shiners (185.46) in the IMPS stratum, channel shiners (57.56) in the MCBU stratum, channel shiners (114) in the SCB stratum, and channel shiners (89.98) for all strata combined (Table 3.3.9).

Fixed Sampling, Mean C/f by Gear and Stratum

All fixed-site sampling was confined in the TWZ stratum using night electrofishing, mini fyke nets, small and large hoop nets, and trawls. Mean catch-per-unit-effort (C/f) of dominant fish species for fixed-site sampling by gear type is listed in Tables 3.4.1 to 3.4.5.

Night Electrofishing

Night electrofishing C/f (fish per 15 min) was highest for gizzard shad (50.17; Table 3.4.1).

Mini Fyke Net

Mini fyke netting C/f (fish per net-day) was highest for channel shiners (782.56; Table 3.4.2).

Small Hoop Net

Small hoop netting C/f (fish per net-day) was highest for common carp (1.17; Table 3.4.3).

Large Hoop Net

Large hoop netting C/f (fish per net-day) was highest for smallmouth buffalo (6.86; Table 3.4.4).

Trawl

Trawling C/f (fish per haul) was highest for channel catfish (6.71; Table 3.4.5).

Length Distributions of Selected Species

Length distributions (expressed as a percentage of total catch for various gears) for the gizzard shad, common carp, smallmouth buffalo, channel catfish, northern pike, white bass, bluegill, largemouth bass, white crappie, black crappie, sauger, walleye, and freshwater drum are illustrated in Figures 3.2 to 3.16. Because data within a single sampling season are taken over a long time and size ranges for certain species of fish can overlap (e.g., a 6-cm-long bluegill collected early in period 1 is not of the same cohort as a 6-cm-long bluegill collected late in period 3), interpretations in the length distributions should be made cautiously. Length distributions of small samples ($n < 100$) may be included but are not statistically meaningful (Anderson and Neumann 1996).

Gizzard Shad

A total of 2,187 gizzard shad were collected from day and night electrofishing with lengths ranging

from 2.0 to 36.9 cm (Figure 3.2). Mean length was 13.1 cm, and peak distribution occurred at 12 cm. Minimal numbers were collected from 18 to 36 cm.

Common Carp

A total of 635 common carp were collected from day and night electrofishing with lengths ranging from 5.6 to 90.0 cm (Figure 3.3). Mean length was 52.7 cm, and a peak in the distribution occurred at 50 cm. The majority of fish were grouped between 46 and 58 cm. Young of the year (fish <1.4 cm long) constituted a small fraction of total catch. Few fish were collected less than 34 cm long.

Smallmouth Buffalo

A total of 313 smallmouth buffalo were collected from small and large hoop netting with lengths ranging from 23.2 to 67.5 cm (Figure 3.4). Mean length was 38.2 cm, and peak distribution occurred at 34 cm with the majority of fish grouped around this peak.

Channel Catfish

A total of 210 channel catfish were collected from small and large hoop netting with lengths ranging from 8.3 to 63.5 cm (Figure 3.5). Mean length was 25.9 cm, and peak distribution occurred at 24 cm. About 8% were greater than 38.1 cm (>15 inches).

Northern Pike

A total of only 12 northern pike were collected from fyke netting with lengths ranging from 46.2 to 86.0 cm (Figure 3.6). Mean length of the northern pike collected was 64.5 cm.

White Bass

A total of 617 white bass were collected from day and night electrofishing with lengths ranging from 3.6 to 39.6 cm (Figure 3.7). Mean length was

13.1, and peak distribution occurred at 12 cm. Fish less than 14.0 cm are probably age 0 and contributed to 77% of the total catch. About 5% were greater than 22.9 cm (>9 inches).

Bluegill

A total of 2,112 bluegills were collected from day and night electrofishing with lengths ranging from 1.0 to 21.2 cm (Figure 3.8). Mean length was 8.9 cm, and peak distribution occurred at 8 cm. About 62% were less than 10 cm (<4 inches) and about 9% were greater than 15.2 cm (>6 inches). A total of 783 bluegills were also collected from fyke netting with lengths ranging from 5.2 to 23.4 cm (Figure 3.9). Mean length was 12.1 cm, and peak distribution occurred at 10 cm. About 16% were greater than 15.2 cm (>6 inches) and less than 1% were greater than 20.3 cm (>8 inches).

Largemouth Bass

A total of 517 largemouth bass were collected from day and night electrofishing with lengths ranging from 3.7 to 47.4 cm (Figure 3.10). Mean length was 19.9 cm, and peak distribution occurred at 8–12 cm. Smaller peaks that probably represent different age classes occurred at 18–22, 26–30, and 32–38 cm. The number of largemouth bass associated with these peaks suggest good recruitment from the past 2 to 3 years. Fish less than 12.0 cm are probably age 0 and contributed to 28% of the total catch. Although this percentage is considerably less than those of the 3 previous years, it would be expected considering the increase in year class strength. About 11% were greater than 35.5 cm (>14 inches).

White Crappie

A total of 106 white crappies were collected from fyke netting with lengths ranging from 8.3 to 35.5 cm (Figure 3.11). Mean length was 21.1 cm, and peak distribution occurred at 20 cm. About 54% were greater than 20.3 cm (>8 inches) and 27% were greater than 25.4 cm (>10 inches).

Black Crappie

A total of 308 black crappies were collected from fyke netting with lengths ranging from 6.0 to 29.8 cm (Figure 3.12). Mean length was 18.5 cm, and peak distribution occurred at 22 cm. About 40% were greater than 20.3 cm (>8 inches) and 7% were greater than 25.4 cm (>10 inches).

Sauger

A total of 460 saugers were collected from day and night electrofishing with lengths ranging from 8.4 to 50.2 cm (Figure 3.13). Mean length was 21.9 cm, and peak distribution occurred at 14 cm. About 20% were greater than 30.5 cm (>12 inches) and 6% were greater than 38.1 cm (>15 inches).

Walleye

A total of 163 walleyes were collected from day and night electrofishing with lengths ranging from 6.5 to 64.9 cm (Figure 3.14). Mean length was 23.0 cm, and peak distribution occurred at 14 cm. About 16% were greater than 38.1 cm (>15 inches).

Freshwater Drum

A total of 416 freshwater drum were collected from day and night electrofishing with lengths ranging from 3.0 to 54.5 cm (Figure 3.15). Mean length was 17.5 cm, and peak distribution occurred at 16 cm. About 9% were greater than 30.5 cm (>12 inches).

Table 3.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 13 of the Mississippi River during 1998. Table entries are numbers of successfully completed standardized monitoring collections.

Table page: 1

Sampling period=1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		2	4	3	4				21
Fyke net	10					4				14
Large hoop net			7	4	3		2		2	18
Small hoop net			7	4	3		2		2	18
Mini fyke net	10		2	4	3	4			2	25
Night electrofishing	2		2	2					2	8
Seine	12		4	12		8				36
Trawling									8	8
Tandem fyke net		5					2			7
Tandem mini fyke net		5					2			7
SUBTOTAL	42	10	24	30	12	20	8	0	16	162

Sampling period=2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		2	4	3	4				21
Fyke net	10					4				14
Large hoop net			7	4	3		2		2	18
Small hoop net			7	4	3		2		2	18
Mini fyke net	10		2	4	3	4			2	25
Night electrofishing	2		2	2		4			2	8
Seine	12		4	12		8				36
Trawling									8	8
Tandem fyke net		5					2			7
Tandem mini fyke net		5					2			7
SUBTOTAL	42	10	24	30	12	20	8	0	16	162

Sampling period=3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	8		2	4	3	4				21
Fyke net	10					4				14
Large hoop net			7	4	3		2		2	18
Small hoop net			7	4	3		2		2	18
Mini fyke net	10		2	4	3	4			2	25
Night electrofishing	2		2	2		4			2	8
Seine	12		4	12		8				36
Trawling									8	8
Tandem fyke net		5					2			7
Tandem mini fyke net		5					2			7
SUBTOTAL	42	10	24	30	12	20	8	0	16	162
	=====									
	126	30	72	90	36	60	24	0	48	486

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 3.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 13 of the Mississippi River. See Table 3.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
2	Silver lamprey	<i>Ichthyomyzon unicuspis</i>	3	-	-	-	-	-	-	-	-	-	-	-	3
3	Lake sturgeon	<i>Acipenser fulvescens</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
4	Shovelnose sturgeon	<i>Scaphirhynchus platorynchus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
5	Longnose gar	<i>Lepisosteus osseus</i>	6	15	2	7	7	7	-	-	-	-	-	-	55
6	Shortnose gar	<i>Lepisosteus platostomus</i>	9	10	40	26	28	10	15	-	-	-	-	-	44
7	Bowfin	<i>Amia calva</i>	4	1	17	2	2	-	1	-	-	-	-	-	138
8	Mooneye	<i>Hiodon tergisus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
9	Gizzard shad	<i>Dorosoma cepedianum</i>	1574	613	146	107	31	73	-	-	-	-	-	-	3278
10	Spottin shiner	<i>Cyprinella spiloptera</i>	60	13	-	-	70	1	353	-	-	-	-	-	497
11	Common carp	<i>Cyprinus carpio</i>	510	125	20	17	50	12	8	19	39	-	-	-	803
12	Speckled chub	<i>Macrhybopsis estivalis</i>	-	-	-	-	2	-	-	-	-	-	-	-	23
13	Silver chub	<i>Macrhybopsis storeri</i>	14	47	-	1	1	1	65	2	-	-	-	-	132
14	Golden shiner	<i>Notemigonus crysoleucas</i>	67	48	3	8	124	24	57	-	-	-	-	-	331
15	Emerald shiner	<i>Notropis atherinoides</i>	1523	216	-	-	253	302	1818	-	-	-	-	-	4112
16	River shiner	<i>Notropis atherinoides</i>	208	33	-	-	353	14	6318	-	-	-	-	-	6926
17	Spottail shiner	<i>Notropis hudsonius</i>	34	9	-	-	29	15	47	-	-	-	-	-	134
18	Channel shiner	<i>Notropis wickliffi</i>	89	264	-	-	5795	551	11411	-	-	-	-	-	18111
19	Pugnose minnow	<i>Opsopoeodus emiliae</i>	1	8	-	-	26	40	23	-	-	-	-	-	98
20	Pathhead minnow	<i>Pimephales promelas</i>	-	-	-	-	3	-	-	-	-	-	-	-	3
21	Bullhead minnow	<i>Pimephales vigilax</i>	93	157	-	-	99	186	967	-	-	-	-	-	1502
22	River carpsucker	<i>Carpiodes carpio</i>	26	22	12	7	71	-	20	-	-	-	-	-	172
23	Quillback	<i>Carpiodes cyprinus</i>	2	7	-	-	1	-	-	-	-	-	-	-	10
24	Highbank carpsucker	<i>Carpiodes velifer</i>	20	29	-	-	-	-	-	-	-	-	-	-	50
25	White sucker	<i>Catostomus commersoni</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
26	Smallmouth buffalo	<i>Ictalurus bubalus</i>	29	41	4	2	2	-	-	10	303	-	-	-	391
27	Bigmouth buffalo	<i>Ictalurus cyprinellus</i>	25	4	-	1	-	-	-	-	-	-	-	-	30
28	Black buffalo	<i>Ictalurus niger</i>	1	2	-	-	-	-	-	-	-	-	-	-	4
29	Unidentified buffalo	<i>Ictalurus sp.</i>	12	3	-	-	-	-	-	-	-	-	-	-	30
30	Spotted sucker	<i>Minypterus melanops</i>	32	7	5	10	4	-	-	-	-	-	-	-	58
31	Silver redhorse	<i>Moxostoma anisurum</i>	5	2	-	-	-	-	-	-	-	-	-	-	7
32	Golden redhorse	<i>Moxostoma erythrurum</i>	9	18	2	-	-	-	-	-	-	-	-	-	29
33	Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	178	83	11	11	13	2	12	-	-	-	-	-	2
34	Unidentified redhorse	<i>Moxostoma sp.</i>	-	17	-	-	-	56	-	-	-	-	-	-	99
35	Unidentified sucker	<i>Unidentified Catostomidae</i>	-	-	-	-	-	-	-	3	-	-	-	-	3
36	Black bullhead	<i>Ameiurus melas</i>	-	-	2	-	-	-	-	-	-	-	-	-	3
37	Yellow bullhead	<i>Ameiurus natalis</i>	2	-	-	-	1	-	-	-	-	-	-	-	2
38	Channel catfish	<i>Ictalurus punctatus</i>	39	38	5	7	43	2	21	196	14	-	-	-	526
39	Stonecat	<i>Noturus flavus</i>	-	-	-	-	3	-	-	-	-	-	-	-	3

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting

S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 3.2: Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 13 of the Mississippi River. See Table 3.1 for the list of sampling gears actually deployed

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Tadpole madtom	<i>Noturus gyrinus</i>	1	-	1	13	3	135	-	1	-	-	-	154	
41	Flatheaded catfish	<i>Platostomus olivaris</i>	16	10	2	1	3	1	-	5	6	-	12	56	
42	Northern pike	<i>Esox lucius</i>	5	4	7	5	-	-	-	-	-	-	-	21	
43	Brook silverside	<i>Labidesthes sicculus</i>	38	99	-	-	124	-	-	961	-	-	-	2	1224
44	Brook stickleback	<i>Culaea inconstans</i>	-	-	-	-	-	-	-	-	-	-	-	2	
45	White bass	<i>Morone chrysops</i>	140	477	25	130	169	-	2	67	3	6	-	-	1034
46	Yellow bass	<i>Morone mississippiensis</i>	3	18	3	-	-	-	-	-	-	-	-	24	
47	Striped x white bass	<i>M. saxatilis x chrysops</i>	1	-	-	-	-	-	-	-	-	-	-	1	
48	Rock bass	<i>Ambloplites rupestris</i>	6	3	1	-	1	-	3	-	-	-	-	-	14
49	Green sunfish	<i>Lepomis cyanellus</i>	-	-	1	-	4	-	2	-	-	-	-	6	
50	Pumpkinseed	<i>Lepomis gibbosus</i>	56	33	102	83	25	8	100	-	-	-	-	407	
51	Warmouth	<i>Lepomis gulosus</i>	7	-	1	1	11	1	-	-	-	-	-	22	
52	Orangespotted sunfish	<i>Lepomis humilis</i>	108	175	10	12	90	378	1	-	-	-	-	1213	
53	Bluegill	<i>Lepomis macrochirus</i>	1329	783	508	276	710	505	3542	33	24	-	-	7710	
54	Pumpkinseed x warmouth	<i>L. gibbosus x gulosus</i>	-	-	-	-	-	-	1	-	-	-	-	1	
55	Pumpkinseed x orangespotted sunfish	<i>L. gibbosus x humilis</i>	1	-	-	-	-	-	-	-	-	-	-	1	
56	Smallmouth bass	<i>Micropterus dolomieu</i>	22	43	-	-	-	-	3	-	-	-	-	68	
57	Largemouth bass	<i>Micropterus salmoides</i>	348	169	24	7	13	3	81	1	-	-	-	646	
58	White crappie	<i>Pomoxis nigromaculatus</i>	87	112	59	47	13	16	15	1	2	-	-	252	
59	Black crappie	<i>Pomoxis nigromaculatus</i>	127	22	182	126	10	14	9	3	13	-	-	506	
60	Western sand darter	<i>Ammocrypta clara</i>	-	-	1	-	-	-	1	-	-	-	-	2	
61	Mud darter	<i>Etheostoma asprigene</i>	2	-	-	-	2	-	27	-	-	-	-	31	
62	Bluntnose darter	<i>Etheostoma chlorosomum</i>	1	-	-	-	-	-	-	-	-	-	-	1	
63	Fantail darter	<i>Etheostoma flabellare</i>	-	-	-	-	-	-	1	-	-	-	-	1	
64	Johnny darter	<i>Etheostoma nigrum</i>	4	-	-	-	7	2	207	-	-	-	-	225	
65	Yellow perch	<i>Perca flavescens</i>	14	8	2	5	1	3	8	1	-	-	-	42	
66	Logperch	<i>Perca caprodes</i>	65	37	-	5	6	6	25	-	-	-	-	139	
67	Slenderhead darter	<i>Perca phoxocephala</i>	1	2	-	-	-	-	1	-	-	-	-	4	
68	River darter	<i>Perca shumardi</i>	6	3	-	-	-	66	-	33	-	-	-	108	
69	Sauger	<i>Stizostedion canadense</i>	96	364	4	13	5	2	5	2	1	-	-	492	
70	Walleye	<i>Stizostedion vitreum</i>	34	129	2	1	8	1	8	1	-	-	-	184	
71	Freshwater drum	<i>Aplodinotus grunniens</i>	63	353	13	27	39	21	31	18	44	-	31	640	
7159			4582	1214	941	8393	2219	27618	295	480	0	288	53189		

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting

S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 3.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Chestnut lamprey	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Silver lamprey	0.05 (0.03)	0.04 (0.04)	0.00 (0.00)	0.08 (0.08)	0.11 (0.11)	0.00 (0.00)
Longnose gar	0.15 (0.08)	0.04 (0.04)	0.00 (0.00)	0.25 (0.18)	0.11 (0.11)	0.17 (0.17)
Shortnose gar	0.24 (0.11)	0.04 (0.04)	0.17 (0.11)	0.25 (0.18)	0.00 (0.00)	0.50 (0.34)
Bowfin	0.06 (0.04)	0.17 (0.13)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Mooneye	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	26.22 (5.89)	45.50 (14.07)	9.67 (3.70)	20.42 (9.40)	5.33 (2.45)	12.17 (3.22)
Spotfin shiner	1.55 (0.53)	0.29 (0.19)	1.00 (0.74)	2.33 (1.08)	0.00 (0.00)	2.17 (1.33)
Common carp	9.51 (1.61)	11.71 (2.85)	2.50 (1.04)	9.08 (2.67)	4.44 (2.11)	8.33 (3.30)
Silver chub	0.38 (0.22)	0.17 (0.10)	0.00 (0.00)	0.75 (0.58)	0.00 (0.00)	0.17 (0.17)
Golden shiner	0.58 (0.16)	1.33 (0.45)	2.83 (1.57)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Emerald shiner	24.01 (5.25)	13.38 (4.41)	12.08 (4.66)	33.25 (10.98)	56.22 (34.46)	25.33 (11.69)
River shiner	3.85 (1.41)	3.71 (2.49)	3.67 (2.62)	4.17 (2.37)	0.33 (0.33)	3.67 (2.88)
Spottail shiner	0.51 (0.16)	0.33 (0.19)	1.25 (0.49)	0.83 (0.37)	0.00 (0.00)	0.17 (0.17)
Channel shiner	1.68 (0.53)	1.75 (1.00)	0.42 (0.26)	2.08 (0.88)	1.11 (0.99)	1.17 (0.98)
Pugnose minnow	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Bullhead minnow	1.81 (0.70)	2.67 (1.57)	0.25 (0.13)	1.42 (0.99)	0.00 (0.00)	1.50 (1.15)
River carpsucker	0.47 (0.15)	0.79 (0.35)	0.17 (0.17)	0.08 (0.08)	0.00 (0.00)	0.67 (0.33)
Quillback	0.04 (0.03)	0.04 (0.04)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Highfin carpsucker	0.38 (0.22)	0.46 (0.46)	0.00 (0.00)	0.50 (0.42)	0.22 (0.15)	0.17 (0.17)
White sucker	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.39 (0.16)	0.96 (0.47)	0.08 (0.08)	0.17 (0.11)	0.33 (0.24)	0.00 (0.00)
Bigmouth buffalo	0.25 (0.14)	0.63 (0.42)	0.17 (0.11)	0.08 (0.08)	0.78 (0.28)	0.00 (0.00)
Black buffalo	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)
Unidentified buffalo	0.14 (0.11)	0.42 (0.34)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Spotted sucker	0.44 (0.18)	1.33 (0.54)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Silver redhorse	0.11 (0.07)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.22 (0.22)	0.17 (0.17)
Golden redhorse	0.17 (0.11)	0.04 (0.04)	0.08 (0.08)	0.42 (0.29)	0.22 (0.15)	0.00 (0.00)
Shorthead redhorse	1.34 (0.33)	1.08 (0.41)	1.17 (0.47)	1.42 (0.53)	12.56 (5.82)	1.33 (0.88)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MC BU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 3.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Yellow bullhead	0.01 (0.01)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.45 (0.15)	0.46 (0.28)	0.25 (0.13)	0.42 (0.23)	1.89 (1.18)	0.50 (0.34)
Tadpole madtom	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Flathead catfish	0.25 (0.09)	0.04 (0.04)	0.25 (0.18)	0.50 (0.19)	0.56 (0.38)	0.17 (0.17)
Northern pike	0.10 (0.05)	0.17 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)
Brook silverside	0.52 (0.24)	1.21 (0.71)	0.42 (0.19)	0.17 (0.11)	0.11 (0.11)	0.17 (0.17)
White bass	2.87 (0.51)	2.42 (0.73)	1.17 (0.46)	3.25 (0.76)	1.11 (0.56)	3.17 (1.40)
Yellow bass	0.04 (0.03)	0.13 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Striped x white bass	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Rock bass	0.09 (0.05)	0.00 (0.00)	0.33 (0.19)	0.08 (0.08)	0.00 (0.00)	0.17 (0.17)
Pumpkinseed	0.68 (0.27)	1.21 (0.68)	1.75 (1.06)	0.25 (0.18)	0.00 (0.00)	0.50 (0.50)
Warmouth	0.15 (0.09)	0.21 (0.12)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.33 (0.33)
Orangespotted sunfish	1.53 (0.59)	4.38 (1.76)	0.08 (0.08)	0.08 (0.08)	0.00 (0.00)	0.17 (0.17)
Bluegill	19.91 (4.12)	45.50 (11.71)	7.50 (2.17)	9.17 (3.24)	1.33 (0.90)	4.17 (2.44)
Pumpkinseed x orangespotted sunfish	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth bass	0.38 (0.14)	0.00 (0.00)	0.25 (0.25)	0.75 (0.30)	0.89 (0.51)	0.33 (0.33)
Largemouth bass	5.12 (0.68)	8.17 (1.07)	6.42 (1.66)	3.42 (0.92)	1.44 (0.80)	3.50 (1.82)
White crappie	1.23 (0.43)	3.50 (1.28)	0.08 (0.08)	0.17 (0.11)	0.00 (0.00)	0.00 (0.00)
Black crappie	1.78 (0.62)	5.04 (1.87)	0.08 (0.08)	0.25 (0.18)	0.22 (0.22)	0.00 (0.00)
Mud darter	0.03 (0.02)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Bluntnose darter	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Johnny darter	0.06 (0.06)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Yellow perch	0.16 (0.07)	0.46 (0.22)	0.25 (0.25)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Logperch	1.49 (0.46)	0.46 (0.15)	0.75 (0.28)	2.83 (1.14)	0.56 (0.44)	1.00 (0.63)
Slenderhead darter	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
River darter	0.14 (0.08)	0.00 (0.00)	0.00 (0.00)	0.25 (0.18)	0.22 (0.22)	0.17 (0.17)
Sauger	1.65 (0.52)	1.50 (0.38)	1.58 (0.58)	1.92 (1.30)	1.00 (0.58)	1.50 (0.56)
Walleye	0.51 (0.15)	0.71 (0.19)	0.42 (0.29)	0.58 (0.34)	0.44 (0.34)	0.17 (0.17)
Freshwater drum	1.03 (0.35)	1.33 (0.47)	1.08 (0.38)	0.67 (0.26)	0.33 (0.17)	1.17 (1.17)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 3.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	SCB
Longnose gar	0.28 (0.13)	0.17 (0.17)	0.33 (0.21)	0.33 (0.33)
Shortnose gar	0.23 (0.15)	0.17 (0.17)	0.33 (0.33)	0.17 (0.17)
Bowfin	0.06 (0.06)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	17.67 (5.44)	33.00 (13.39)	9.50 (5.61)	9.50 (6.77)
Spotfin shiner	0.56 (0.40)	0.17 (0.17)	0.17 (0.17)	1.67 (1.48)
Common carp	5.77 (1.24)	2.17 (0.60)	5.67 (2.29)	10.67 (3.16)
Silver chub	2.46 (1.21)	0.67 (0.49)	4.50 (3.02)	1.83 (0.91)
Golden shiner	1.30 (0.54)	1.67 (1.12)	0.83 (0.65)	1.50 (1.02)
Emerald shiner	7.36 (2.38)	5.17 (3.18)	6.50 (3.02)	11.50 (6.65)
River shiner	1.11 (0.69)	0.33 (0.21)	2.33 (1.76)	0.33 (0.21)
Spottail shiner	0.40 (0.11)	0.17 (0.17)	0.67 (0.21)	0.33 (0.21)
Channel shiner	7.68 (3.45)	0.67 (0.42)	17.50 (8.87)	2.50 (0.81)
Pugnose minnow	0.41 (0.29)	1.17 (0.83)	0.00 (0.00)	0.00 (0.00)
Bullhead minnow	8.82 (6.10)	21.83 (17.48)	0.67 (0.33)	3.67 (2.30)
River carpsucker	0.99 (0.47)	0.67 (0.49)	1.50 (1.12)	0.67 (0.33)
Quillback	0.39 (0.32)	0.00 (0.00)	1.00 (0.82)	0.00 (0.00)
Highfin carpsucker	1.06 (0.37)	0.50 (0.50)	1.83 (0.70)	0.67 (0.67)
Smallmouth buffalo	1.46 (0.54)	1.67 (0.80)	2.17 (1.19)	0.17 (0.17)
Bigmouth buffalo	0.19 (0.14)	0.17 (0.17)	0.33 (0.33)	0.00 (0.00)
Black buffalo	0.13 (0.08)	0.00 (0.00)	0.33 (0.21)	0.00 (0.00)
Unidentified buffalo	0.18 (0.10)	0.33 (0.21)	0.17 (0.17)	0.00 (0.00)
Spotted sucker	0.41 (0.29)	1.00 (0.82)	0.17 (0.17)	0.00 (0.00)
Silver redhorse	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.33 (0.33)
Golden redhorse	1.08 (0.96)	0.00 (0.00)	2.67 (2.47)	0.17 (0.17)
Shorthead redhorse	4.46 (0.99)	1.83 (1.64)	6.67 (1.58)	4.67 (1.96)
Unidentified redhorse	0.85 (0.51)	0.00 (0.00)	0.83 (0.83)	2.00 (1.48)
Channel catfish	1.98 (1.00)	0.17 (0.17)	4.17 (2.54)	1.17 (0.60)
Flathead catfish	0.38 (0.17)	0.17 (0.17)	0.50 (0.34)	0.50 (0.34)
Northern pike	0.06 (0.06)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	SCB
Brook silverside	4.35 (2.19)	9.33 (6.15)	1.83 (1.14)	1.50 (0.85)
White bass	13.97 (4.05)	16.17 (10.98)	18.00 (3.44)	5.17 (1.17)
Yellow bass	0.79 (0.33)	1.33 (0.61)	0.83 (0.65)	0.00 (0.00)
Pumpkinseed	1.72 (1.00)	4.50 (2.87)	0.17 (0.17)	0.33 (0.21)
Orangespotted sunfish	8.98 (4.78)	22.00 (13.51)	1.17 (0.48)	3.33 (3.33)
Bluegill	34.13 (8.74)	65.83 (23.35)	11.83 (4.60)	25.17 (10.35)
Smallmouth bass	0.39 (0.14)	0.00 (0.00)	0.67 (0.33)	0.50 (0.22)
Largemouth bass	6.12 (2.53)	12.83 (7.09)	1.67 (0.67)	3.83 (1.90)
White crappie	0.59 (0.40)	1.00 (1.00)	0.50 (0.50)	0.17 (0.17)
Black crappie	1.04 (0.29)	2.00 (0.73)	0.67 (0.33)	0.33 (0.21)
Western sand darter	0.06 (0.06)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Johnny darter	0.25 (0.13)	0.17 (0.17)	0.17 (0.17)	0.50 (0.34)
Yellow perch	0.46 (0.25)	1.33 (0.71)	0.00 (0.00)	0.00 (0.00)
Logperch	1.34 (0.49)	0.17 (0.17)	2.17 (1.17)	1.67 (0.67)
Slenderhead darter	0.11 (0.08)	0.00 (0.00)	0.17 (0.17)	0.17 (0.17)
River darter	0.06 (0.06)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Sauger	9.49 (2.22)	2.83 (0.83)	15.67 (5.26)	9.17 (3.17)
Walleye	3.01 (0.74)	1.33 (0.56)	3.83 (1.62)	4.00 (1.29)
Freshwater drum	10.29 (2.76)	6.17 (2.98)	16.00 (6.42)	7.33 (2.23)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS
Longnose gar	0.04 (0.03)	0.04 (0.04)	0.09 (0.09)
Shortnose gar	1.12 (0.40)	1.18 (0.45)	0.51 (0.27)
Bowfin	0.51 (0.15)	0.55 (0.17)	0.08 (0.08)
Gizzard shad	2.41 (1.13)	1.84 (0.97)	7.83 (7.65)
Common carp	0.55 (0.16)	0.58 (0.18)	0.27 (0.14)
Golden shiner	0.05 (0.04)	0.04 (0.04)	0.18 (0.12)
River carpsucker	0.37 (0.21)	0.41 (0.23)	0.00 (0.00)
Smallmouth buffalo	0.12 (0.07)	0.14 (0.08)	0.00 (0.00)
Spotted sucker	0.15 (0.11)	0.17 (0.12)	0.00 (0.00)
Golden redhorse	0.06 (0.06)	0.07 (0.07)	0.00 (0.00)
Shorthead redhorse	0.33 (0.15)	0.35 (0.16)	0.09 (0.09)
Black bullhead	0.04 (0.03)	0.03 (0.03)	0.08 (0.08)
Channel catfish	0.11 (0.05)	0.10 (0.06)	0.17 (0.12)
Flathead catfish	0.06 (0.04)	0.07 (0.05)	0.00 (0.00)
Northern pike	0.22 (0.10)	0.24 (0.11)	0.00 (0.00)
White bass	0.75 (0.35)	0.82 (0.39)	0.08 (0.08)
Yellow bass	0.09 (0.05)	0.10 (0.06)	0.00 (0.00)
Rock bass	0.01 (0.01)	0.00 (0.00)	0.08 (0.08)
Pumpkinseed	1.29 (0.56)	0.69 (0.35)	6.95 (4.97)
Warmouth	0.03 (0.03)	0.03 (0.03)	0.00 (0.00)
Orangespotted sunfish	0.33 (0.15)	0.36 (0.16)	0.00 (0.00)
Bluegill	14.41 (6.70)	15.29 (7.43)	6.05 (3.27)
Largemouth bass	0.59 (0.20)	0.59 (0.22)	0.60 (0.24)
White crappie	1.78 (0.52)	1.96 (0.58)	0.08 (0.08)
Black crappie	5.31 (1.16)	5.72 (1.28)	1.40 (0.64)
Yellow perch	0.04 (0.03)	0.04 (0.04)	0.10 (0.10)
Sauger	0.10 (0.07)	0.10 (0.08)	0.09 (0.09)
Walleye	0.06 (0.04)	0.07 (0.05)	0.00 (0.00)
Freshwater drum	0.32 (0.15)	0.31 (0.16)	0.35 (0.27)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO
Longnose gar	0.33 (0.32)	0.03 (0.03)	0.50 (0.50)
Shortnose gar	0.53 (0.28)	0.72 (0.22)	0.42 (0.42)
Bowfin	0.03 (0.02)	0.07 (0.05)	0.00 (0.00)
Gizzard shad	1.35 (0.85)	3.66 (2.31)	0.00 (0.00)
Common carp	0.30 (0.13)	0.51 (0.14)	0.18 (0.18)
Silver chub	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Golden shiner	0.14 (0.08)	0.24 (0.15)	0.08 (0.08)
River carpsucker	0.09 (0.06)	0.24 (0.16)	0.00 (0.00)
Smallmouth buffalo	0.02 (0.02)	0.07 (0.05)	0.00 (0.00)
Bigmouth buffalo	0.05 (0.05)	0.00 (0.00)	0.08 (0.08)
Spotted sucker	0.12 (0.09)	0.34 (0.24)	0.00 (0.00)
Shorthead redhorse	0.25 (0.17)	0.26 (0.19)	0.25 (0.25)
Channel catfish	0.29 (0.13)	0.07 (0.05)	0.42 (0.21)
Tadpole madtom	0.06 (0.06)	0.00 (0.00)	0.09 (0.09)
Flathead catfish	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Northern pike	0.18 (0.16)	0.07 (0.05)	0.25 (0.25)
White bass	1.85 (1.22)	4.30 (3.30)	0.42 (0.20)
Pumpkinseed	1.03 (0.42)	2.81 (1.15)	0.00 (0.00)
Warmouth	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
Orangespotted sunfish	0.15 (0.06)	0.40 (0.17)	0.00 (0.00)
Bluegill	4.29 (0.83)	8.84 (1.92)	1.63 (0.70)
Largemouth bass	0.13 (0.06)	0.21 (0.08)	0.08 (0.08)
White crappie	0.62 (0.30)	1.67 (0.82)	0.00 (0.00)
Black crappie	2.25 (0.68)	3.83 (0.76)	1.32 (0.98)
Yellow perch	0.06 (0.04)	0.17 (0.10)	0.00 (0.00)
Sauger	0.24 (0.15)	0.38 (0.28)	0.16 (0.16)
Walleye	0.05 (0.05)	0.00 (0.00)	0.08 (0.08)
Freshwater drum	0.71 (0.23)	0.62 (0.28)	0.76 (0.33)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Longnose gar	0.09 (0.05)	0.17 (0.10)	0.08 (0.08)	0.10 (0.10)	0.00 (0.00)	0.00 (0.00)
Shortnose gar	0.29 (0.12)	0.51 (0.31)	0.60 (0.20)	0.27 (0.14)	0.00 (0.00)	0.00 (0.00)
Bowfin	0.03 (0.02)	0.08 (0.05)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	0.27 (0.17)	0.65 (0.51)	0.26 (0.18)	0.00 (0.00)	0.80 (0.68)	0.16 (0.16)
Spotfin shiner	1.08 (0.32)	0.38 (0.32)	0.53 (0.38)	1.71 (0.69)	0.00 (0.00)	1.19 (0.62)
Common carp	0.49 (0.20)	0.51 (0.19)	0.25 (0.13)	0.55 (0.47)	2.57 (2.14)	0.34 (0.34)
Golden shiner	1.38 (1.28)	4.14 (3.87)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Emerald shiner	2.22 (0.75)	0.88 (0.35)	2.81 (0.99)	2.53 (1.45)	1.59 (1.13)	3.44 (2.00)
River shiner	5.09 (2.69)	0.14 (0.11)	8.25 (3.22)	7.57 (5.50)	4.10 (2.65)	7.53 (6.90)
Spottail shiner	1.01 (0.79)	0.07 (0.05)	0.34 (0.19)	0.10 (0.10)	0.11 (0.11)	3.69 (3.12)
Channel shiner	28.23 (15.48)	5.90 (3.10)	15.86 (8.56)	28.41 (14.48)	5.96 (3.31)	59.52 (57.12)
Pugnose minnow	0.31 (0.09)	0.72 (0.24)	0.00 (0.00)	0.19 (0.13)	0.00 (0.00)	0.00 (0.00)
Fathead minnow	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.11 (0.11)	0.00 (0.00)
Bullhead minnow	1.40 (0.42)	1.48 (0.85)	1.14 (0.66)	0.85 (0.54)	0.24 (0.16)	2.17 (0.96)
River carpsucker	2.40 (2.11)	0.00 (0.00)	0.17 (0.11)	6.32 (5.67)	0.00 (0.00)	0.19 (0.19)
Quillback	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.06 (0.04)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)
Unidentified buffalo	0.10 (0.08)	0.31 (0.24)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Spotted sucker	0.04 (0.03)	0.10 (0.10)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Shorthead redhorse	0.09 (0.05)	0.11 (0.08)	0.77 (0.77)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
Unidentified redhorse	1.43 (0.95)	0.21 (0.21)	0.00 (0.00)	0.71 (0.50)	2.15 (2.15)	4.25 (3.68)
Yellow bullhead	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.22 (0.10)	0.07 (0.07)	3.13 (2.05)	0.10 (0.10)	0.22 (0.14)	0.18 (0.18)
Tadpole madtom	0.10 (0.05)	0.17 (0.11)	0.34 (0.14)	0.09 (0.09)	0.21 (0.14)	0.00 (0.00)
Flathead catfish	0.07 (0.04)	0.00 (0.00)	0.09 (0.09)	0.18 (0.12)	0.00 (0.00)	0.00 (0.00)
Brook silverside	0.39 (0.31)	0.14 (0.11)	8.83 (8.83)	0.09 (0.09)	0.10 (0.10)	0.00 (0.00)
White bass	1.13 (0.60)	0.35 (0.23)	1.18 (0.75)	0.44 (0.21)	12.36 (11.60)	2.91 (2.31)
Rock bass	0.00 (0.00)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Green sunfish	0.11 (0.08)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.12 (0.12)	0.19 (0.19)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 3.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Pumpkinseed	0.10 (0.07)	0.10 (0.08)	1.73 (1.73)	0.00 (0.00)	0.12 (0.12)	0.00 (0.00)
Warmouth	0.17 (0.09)	0.27 (0.21)	0.08 (0.08)	0.09 (0.09)	0.00 (0.00)	0.19 (0.19)
Orangespotted sunfish	0.99 (0.25)	2.02 (0.63)	0.00 (0.00)	0.71 (0.33)	1.84 (1.71)	0.18 (0.18)
Bluegill	7.18 (2.03)	9.92 (4.35)	2.99 (1.64)	8.98 (3.80)	29.22 (24.95)	1.00 (0.51)
Largemouth bass	0.14 (0.07)	0.17 (0.12)	0.25 (0.13)	0.09 (0.09)	0.34 (0.34)	0.17 (0.17)
White crappie	0.13 (0.07)	0.19 (0.08)	0.00 (0.00)	0.17 (0.17)	0.56 (0.30)	0.00 (0.00)
Black crappie	0.10 (0.04)	0.28 (0.11)	0.08 (0.08)	0.00 (0.00)	0.11 (0.11)	0.00 (0.00)
Mud darter	0.02 (0.02)	0.07 (0.07)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Johnny darter	0.10 (0.05)	0.14 (0.06)	0.18 (0.18)	0.00 (0.00)	0.00 (0.00)	0.19 (0.19)
Yellow perch	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Logperch	0.06 (0.04)	0.07 (0.07)	0.00 (0.00)	0.09 (0.09)	0.24 (0.24)	0.00 (0.00)
River darter	0.83 (0.48)	1.48 (1.34)	0.00 (0.00)	0.09 (0.09)	0.44 (0.23)	1.20 (0.67)
Sauger	0.17 (0.08)	0.00 (0.00)	0.00 (0.00)	0.35 (0.20)	0.00 (0.00)	0.16 (0.16)
Walleye	0.17 (0.14)	0.07 (0.05)	0.17 (0.12)	0.37 (0.37)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	0.48 (0.21)	0.10 (0.08)	0.00 (0.00)	0.35 (0.15)	0.23 (0.23)	1.22 (0.78)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MC BU - Main channel border, unstructured

Table 3.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO
Shortnose gar	0.17 (0.08)	0.30 (0.15)	0.09 (0.09)
Gizzard shad	0.94 (0.55)	2.38 (1.50)	0.10 (0.10)
Spotfin shiner	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Common carp	0.19 (0.08)	0.37 (0.17)	0.09 (0.09)
Silver chub	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)
Golden shiner	0.30 (0.20)	0.80 (0.54)	0.00 (0.00)
Emerald shiner	5.49 (2.41)	8.71 (5.43)	3.61 (2.13)
River shiner	0.68 (0.59)	0.07 (0.05)	1.03 (0.93)
Spottail shiner	0.41 (0.18)	0.33 (0.16)	0.46 (0.27)
Channel shiner	12.79 (5.97)	14.69 (10.86)	11.68 (7.02)
Pugnose minnow	0.48 (0.19)	1.32 (0.52)	0.00 (0.00)
Bullhead minnow	2.38 (1.09)	6.16 (2.96)	0.17 (0.17)
Unidentified buffalo	0.11 (0.07)	0.00 (0.00)	0.18 (0.11)
Shorthead redhorse	0.11 (0.11)	0.00 (0.00)	0.18 (0.18)
Channel catfish	0.06 (0.05)	0.03 (0.03)	0.08 (0.08)
Stonecat	0.12 (0.11)	0.04 (0.04)	0.18 (0.18)
Tadpole madtom	0.04 (0.02)	0.10 (0.05)	0.00 (0.00)
Flathead catfish	0.05 (0.05)	0.00 (0.00)	0.08 (0.08)
White bass	0.55 (0.25)	0.30 (0.19)	0.70 (0.38)
Pumpkinseed	0.15 (0.07)	0.23 (0.08)	0.10 (0.10)
Warmouth	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)
Orangespotted sunfish	4.62 (3.22)	12.41 (8.75)	0.08 (0.08)
Bluegill	6.17 (3.40)	16.76 (9.25)	0.00 (0.00)
Largemouth bass	0.08 (0.06)	0.07 (0.04)	0.09 (0.09)
White crappie	0.20 (0.06)	0.53 (0.16)	0.00 (0.00)
Black crappie	0.17 (0.07)	0.46 (0.18)	0.00 (0.00)
Johnny darter	0.07 (0.06)	0.03 (0.03)	0.09 (0.09)
Yellow perch	0.04 (0.02)	0.10 (0.05)	0.00 (0.00)
Logperch	0.16 (0.07)	0.13 (0.08)	0.17 (0.11)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCO	IMPO
Sauger	0.11 (0.07)	0.00 (0.00)	0.17 (0.11)
Walleye	0.06 (0.06)	0.00 (0.00)	0.10 (0.10)
Freshwater drum	0.91 (0.53)	0.21 (0.08)	1.32 (0.84)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	IMPO	MCBU	MCBW	SCB
Common carp	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)	0.09 (0.09)
Silver chub	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)	0.06 (0.06)	0.00 (0.00)
Smallmouth buffalo	0.05 (0.02)	0.00 (0.00)	0.13 (0.09)	0.06 (0.06)	0.07 (0.05)
Channel catfish	1.69 (0.42)	1.04 (0.45)	2.98 (1.26)	1.86 (1.41)	1.93 (0.56)
Flathead catfish	0.02 (0.01)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.05 (0.03)
White bass	0.06 (0.05)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.05 (0.03)
Bluegill	0.12 (0.03)	0.00 (0.00)	0.08 (0.08)	0.44 (0.44)	0.57 (0.16)
Largemouth bass	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
White crappie	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Black crappie	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.04)
Sauger	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.11 (0.11)	0.00 (0.00)
Walleye	0.05 (0.05)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	0.13 (0.08)	0.00 (0.00)	0.42 (0.33)	0.12 (0.08)	0.12 (0.06)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MC BU - Main channel border, unstructured

Table 3.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	IMPO	MCBU	MCBW	SCB
Shovelnose sturgeon	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.12 (0.12)	0.00 (0.00)
Gizzard shad	0.05 (0.05)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Common carp	0.12 (0.07)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.66 (0.39)
River carpsucker	0.07 (0.03)	0.00 (0.00)	0.08 (0.06)	0.00 (0.00)	0.27 (0.15)
Highfin carpsucker	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Smallmouth buffalo	0.83 (0.17)	0.17 (0.11)	1.25 (0.51)	5.37 (3.82)	2.32 (0.57)
Black buffalo	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Shorthead redhorse	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.28 (0.19)	0.07 (0.05)
Channel catfish	0.25 (0.20)	0.34 (0.34)	0.17 (0.17)	0.11 (0.11)	0.05 (0.03)
Tadpole madtom	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Flathead catfish	0.01 (0.01)	0.00 (0.00)	0.04 (0.04)	0.17 (0.12)	0.00 (0.00)
White bass	0.07 (0.05)	0.09 (0.09)	0.04 (0.04)	0.00 (0.00)	0.08 (0.08)
Bluegill	0.05 (0.04)	0.00 (0.00)	0.00 (0.00)	0.28 (0.19)	0.28 (0.23)
White crappie	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)
Black crappie	0.05 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.28 (0.16)
Sauger	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)
Freshwater drum	0.44 (0.31)	0.53 (0.53)	0.34 (0.26)	0.70 (0.42)	0.32 (0.13)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	SCB
Longnose gar	0.06 (0.03)	0.14 (0.07)	0.04 (0.04)	0.03 (0.03)	0.00 (0.00)
Shortnose gar	0.23 (0.07)	0.17 (0.06)	0.00 (0.00)	0.06 (0.04)	0.58 (0.26)
Bowfin	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	6.95 (5.64)	19.89 (16.90)	0.00 (0.00)	0.19 (0.14)	0.83 (0.83)
Spotfin shiner	2.48 (1.21)	2.11 (1.15)	5.46 (2.30)	3.89 (3.08)	0.50 (0.23)
Common carp	0.06 (0.03)	0.17 (0.07)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Silver chub	0.62 (0.34)	1.58 (1.02)	0.00 (0.00)	0.19 (0.09)	0.08 (0.08)
Golden shiner	0.54 (0.23)	1.44 (0.69)	0.08 (0.08)	0.03 (0.03)	0.17 (0.11)
Emerald shiner	17.20 (4.33)	20.31 (7.52)	8.88 (3.82)	21.72 (8.55)	7.67 (5.92)
River shiner	30.25 (7.73)	20.56 (7.40)	170.54 (76.29)	36.42 (18.00)	14.50 (5.31)
Spottail shiner	0.52 (0.25)	0.06 (0.04)	0.33 (0.26)	0.75 (0.36)	0.83 (0.83)
Channel shiner	89.98 (20.91)	97.78 (32.37)	185.46 (142.46)	57.56 (24.89)	114.00 (56.97)
Pugnose minnow	0.22 (0.08)	0.58 (0.24)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)
Bullhead minnow	9.39 (2.12)	15.39 (4.58)	8.29 (5.71)	1.58 (0.63)	13.08 (5.65)
River carpsucker	0.20 (0.08)	0.33 (0.14)	0.13 (0.09)	0.06 (0.04)	0.25 (0.25)
Unidentified buffalo	0.03 (0.02)	0.08 (0.05)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Shorthead redhorse	0.14 (0.06)	0.19 (0.10)	0.04 (0.04)	0.03 (0.03)	0.25 (0.18)
Unidentified redhorse	0.27 (0.19)	0.06 (0.04)	0.00 (0.00)	0.67 (0.51)	0.00 (0.00)
Unidentified sucker	0.03 (0.02)	0.03 (0.03)	0.00 (0.00)	0.06 (0.04)	0.00 (0.00)
Channel catfish	0.24 (0.09)	0.08 (0.06)	0.04 (0.04)	0.39 (0.20)	0.25 (0.18)
Tadpole madtom	0.61 (0.23)	0.89 (0.51)	3.92 (1.59)	0.06 (0.06)	0.58 (0.58)
Brook silverside	5.68 (2.64)	12.17 (7.76)	18.21 (10.56)	2.22 (0.82)	0.50 (0.50)
Brook stickleback	0.02 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.04)	0.00 (0.00)
White bass	0.66 (0.14)	0.72 (0.28)	0.21 (0.15)	0.92 (0.27)	0.25 (0.13)
Rock bass	0.01 (0.01)	0.03 (0.03)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)
Green sunfish	0.03 (0.02)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Pumpkinseed	0.79 (0.26)	1.47 (0.65)	1.42 (0.87)	0.08 (0.05)	0.83 (0.53)
Warmouth	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Orangespotted sunfish	6.39 (1.96)	6.53 (1.29)	0.08 (0.08)	0.31 (0.18)	16.00 (7.49)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured
 MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 3.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 13 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 3.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	SCB
Bluegill	33.53 (5.76)	87.89 (16.36)	7.46 (2.77)	1.11 (0.50)	13.25 (7.15)
Pumpkinseed x warmouth	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth bass	0.03 (0.02)	0.00 (0.00)	0.04 (0.04)	0.03 (0.03)	0.08 (0.08)
Largemouth bass	0.77 (0.21)	1.42 (0.51)	0.50 (0.19)	0.28 (0.16)	0.67 (0.40)
White crappie	0.14 (0.05)	0.42 (0.16)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Black crappie	0.07 (0.05)	0.19 (0.14)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)
Western sand darter	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Mud darter	0.46 (0.26)	0.22 (0.13)	0.04 (0.04)	0.00 (0.00)	1.50 (1.02)
Fantail darter	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Johnny darter	2.70 (0.53)	2.58 (0.68)	0.88 (0.46)	0.44 (0.16)	6.42 (1.89)
Yellow perch	0.07 (0.05)	0.22 (0.15)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Logperch	0.28 (0.08)	0.17 (0.07)	0.08 (0.06)	0.36 (0.17)	0.33 (0.19)
Slenderhead darter	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
River darter	0.30 (0.10)	0.22 (0.08)	0.21 (0.10)	0.53 (0.24)	0.08 (0.08)
Sauger	0.07 (0.04)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)	0.17 (0.11)
Walleye	0.08 (0.04)	0.03 (0.03)	0.13 (0.13)	0.06 (0.06)	0.17 (0.11)
Freshwater drum	0.33 (0.10)	0.44 (0.19)	0.00 (0.00)	0.36 (0.20)	0.17 (0.11)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 3.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Longnose gar	1.67 (0.76)
Shortnose gar	1.00 (0.68)
Gizzard shad	50.17 (22.43)
Spotfin shiner	0.17 (0.17)
Common carp	2.33 (0.67)
Silver chub	0.83 (0.48)
Golden shiner	4.00 (4.00)
Emerald shiner	12.83 (7.56)
River shiner	2.50 (1.45)
Spottail shiner	0.33 (0.21)
Channel shiner	23.33 (15.65)
Pugnose minnow	0.17 (0.17)
River carpsucker	0.83 (0.31)
Quillback	0.17 (0.17)
Highfin carpsucker	1.83 (0.54)
Smallmouth buffalo	2.83 (1.70)
Bigmouth buffalo	0.17 (0.17)
Golden redhorse	0.17 (0.17)
Shorthead redhorse	0.67 (0.33)
Channel catfish	0.83 (0.31)
Flathead catfish	0.50 (0.22)
Northern pike	0.50 (0.34)
Brook silverside	3.83 (2.69)
White bass	40.17 (13.21)
Yellow bass	0.83 (0.83)
Rock bass	0.50 (0.34)
Pumpkinseed	0.50 (0.34)
Orangespotted sunfish	2.67 (1.50)
Bluegill	27.67 (18.56)
Smallmouth bass	6.00 (1.59)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 13 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	TWZ
Largemouth bass	9.83 (5.82)
White crappie	0.33 (0.33)
Black crappie	0.67 (0.33)
Logperch	2.17 (1.33)
River darter	0.33 (0.33)
Sauger	33.00 (10.05)
Walleye	12.33 (3.89)
Freshwater drum	29.33 (24.78)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 13 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Shortnose gar	0.51 (0.34)
Gizzard shad	0.35 (0.35)
Spotfin shiner	4.47 (2.19)
Common carp	0.18 (0.18)
Speckled chub	0.34 (0.21)
Silver chub	0.18 (0.18)
Golden shiner	0.18 (0.18)
Emerald shiner	22.98 (17.69)
River shiner	15.72 (8.06)
Spottail shiner	0.17 (0.17)
Channel shiner	782.56 (759.38)
Pugnose minnow	0.53 (0.36)
Fathead minnow	0.17 (0.17)
Bullhead minnow	3.14 (2.75)
Tadpole madtom	0.18 (0.18)
Brook silverside	1.93 (1.20)
White bass	2.16 (1.95)
Orangespotted sunfish	1.05 (0.67)
Bluegill	3.52 (2.36)
Logperch	0.17 (0.17)
River darter	1.92 (1.01)
Freshwater drum	4.02 (3.62)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 13 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Common carp	1.17 (1.17)
Smallmouth buffalo	0.25 (0.17)
Channel catfish	0.17 (0.17)
Flathead catfish	0.17 (0.11)
Yellow perch	0.08 (0.08)
Freshwater drum	0.08 (0.08)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
BWCO - Backwater, contiguous, offshore SCB - Side channel border
IMPS - Impounded, shoreline TRI - Tributary mouth
IMPO - Impounded, offshore TWZ - Tailwater
MCBU - Main channel border, unstructured

Table 3.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 13 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Common carp	0.92 (0.92)
River carpsucker	0.08 (0.08)
Smallmouth buffalo	6.86 (3.60)
Channel catfish	0.17 (0.11)
Flathead catfish	0.17 (0.11)
White bass	0.08 (0.08)
Bluegill	0.67 (0.49)
Black crappie	0.17 (0.17)
Freshwater drum	0.42 (0.20)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 3.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 13 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Lake sturgeon	0.04 (0.04)
Shovelnose sturgeon	2.21 (0.50)
Common carp	0.13 (0.09)
Speckled chub	0.88 (0.34)
Silver chub	0.04 (0.04)
Channel shiner	0.04 (0.04)
Shorthead redhorse	0.08 (0.06)
Channel catfish	6.71 (1.80)
Flathead catfish	0.50 (0.23)
Brook silverside	0.08 (0.06)
Freshwater drum	1.29 (0.40)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Gizzard shad Electrofishing n=2187

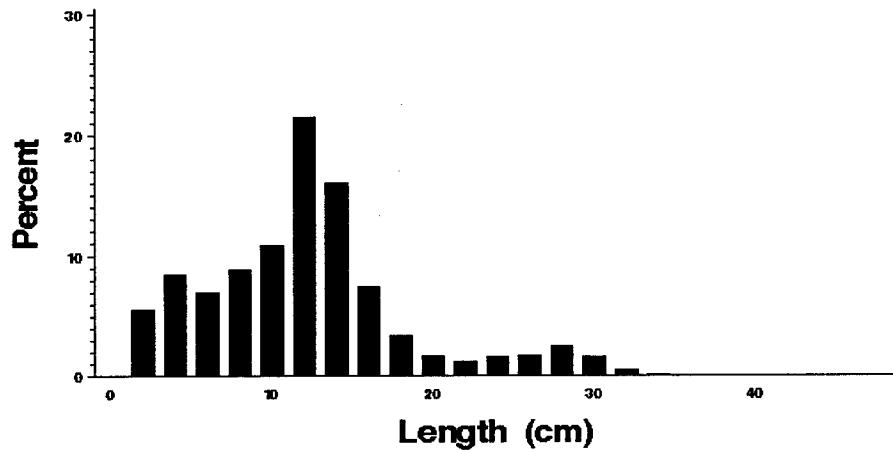


Figure 3.2. Length distributions (length) as a percentage of catch (percent) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

Common carp Electrofishing n=635

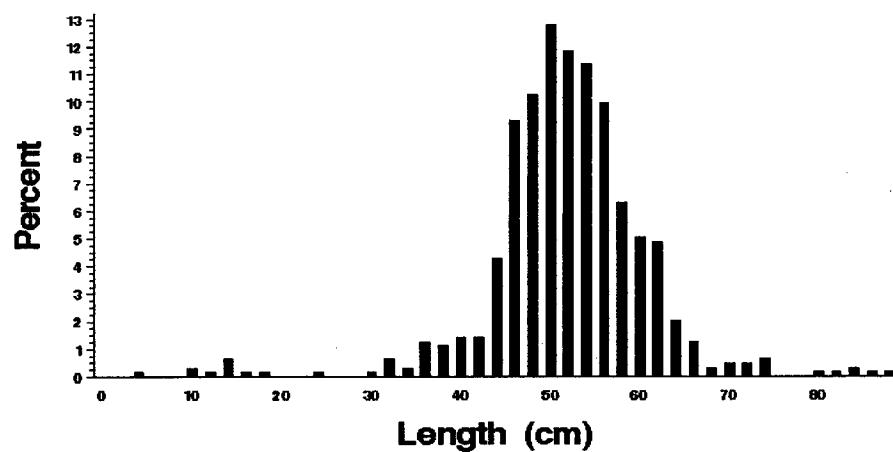


Figure 3.3. Length distributions (length) as a percentage of catch (percent) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

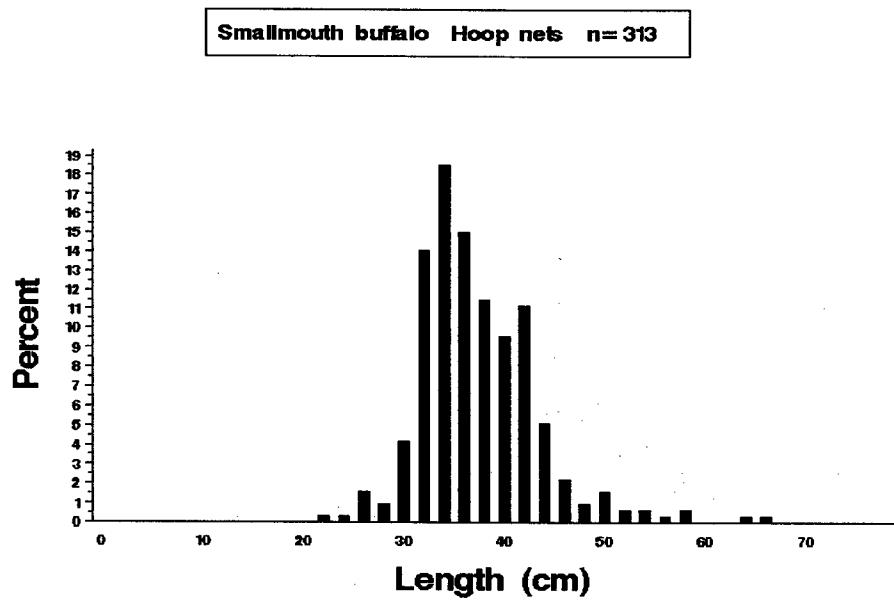


Figure 3.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by small and large hoop netting in Upper Mississippi River Pool 13 during 1998.

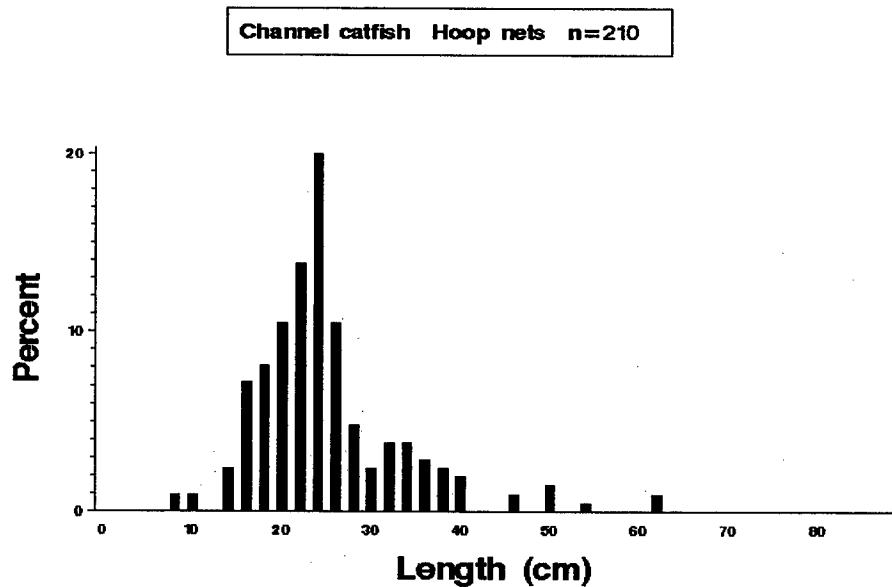


Figure 3.5. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by small and large hoop netting in Upper Mississippi River Pool 13 during 1998.

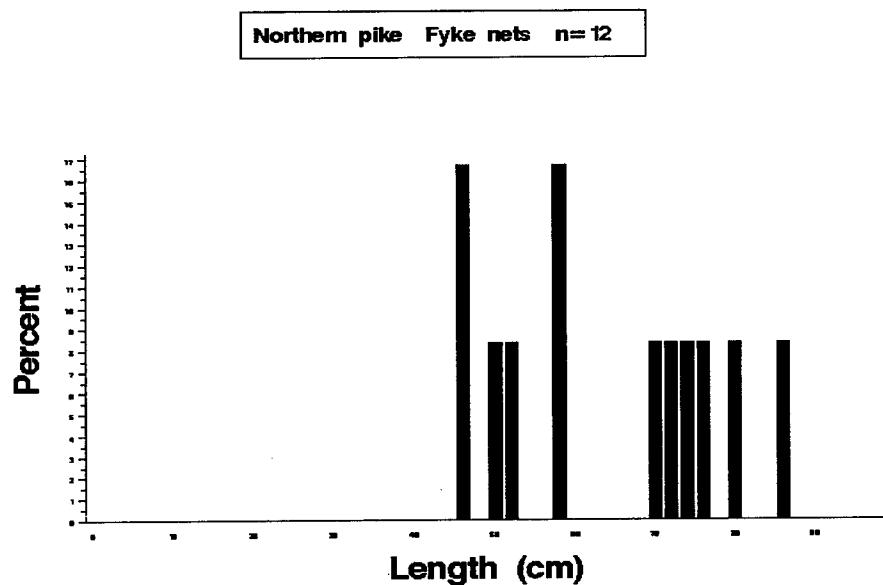


Figure 3.7. Length distributions (length) as a percentage of catch (percent) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

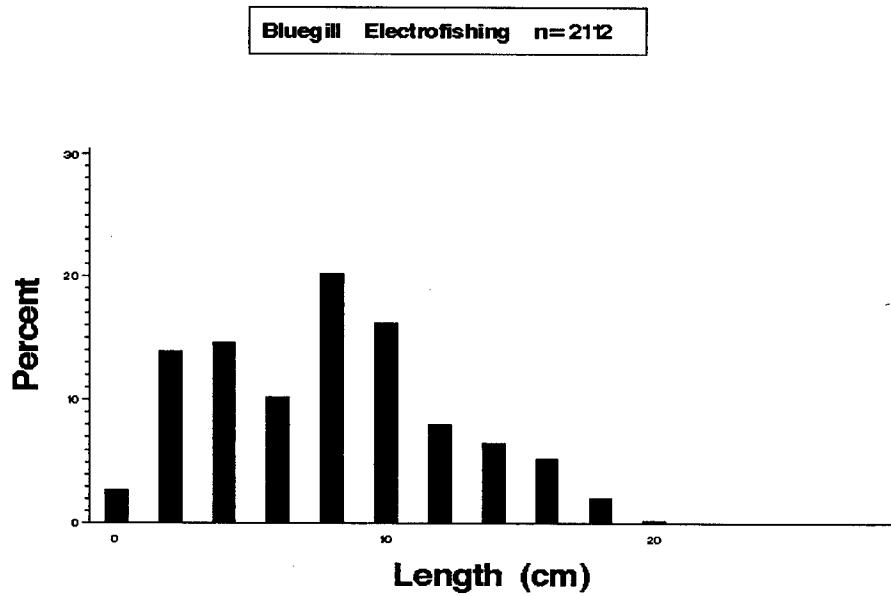


Figure 3.8. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

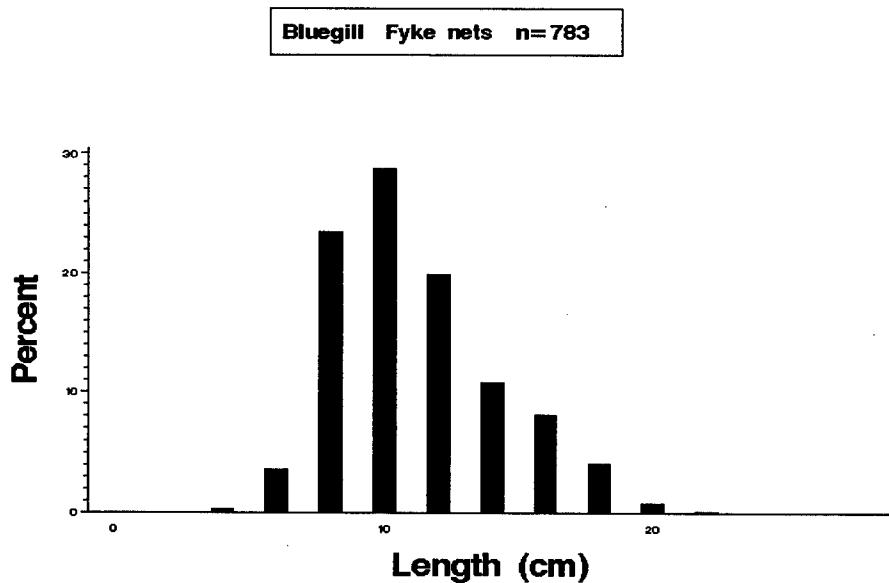


Figure 3.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1998.

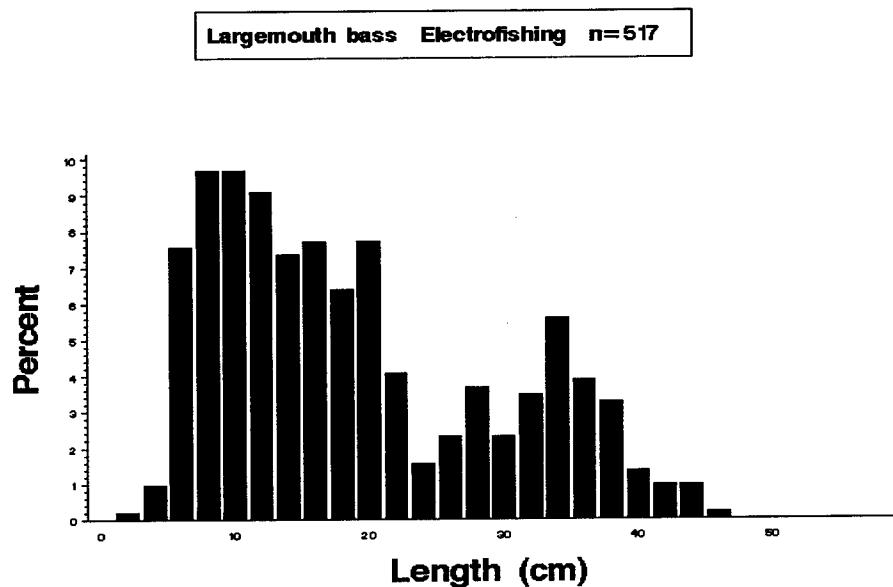


Figure 3.10. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

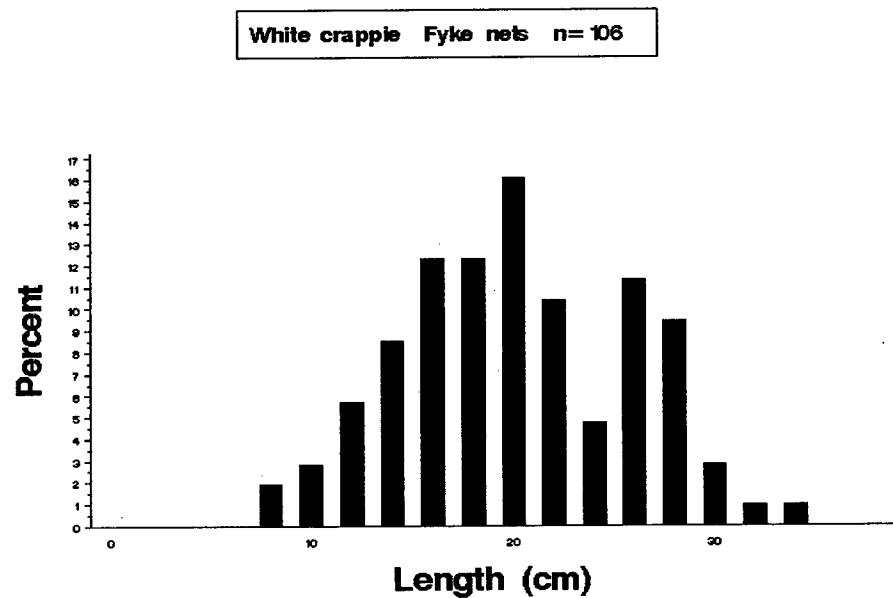


Figure 3.11. Length distributions (*length*) as a percentage of catch (*percent*) for white crappie (*Pomoxis annularis*) collected by fyke netting in Upper Mississippi River Pool 13 during 1998.

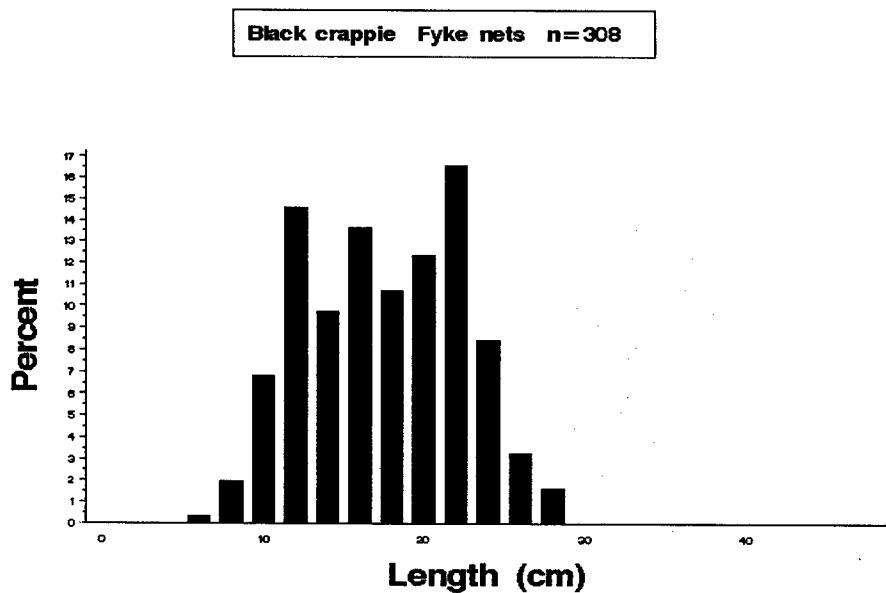


Figure 3.12. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in Upper Mississippi River Pool 13 during 1998.

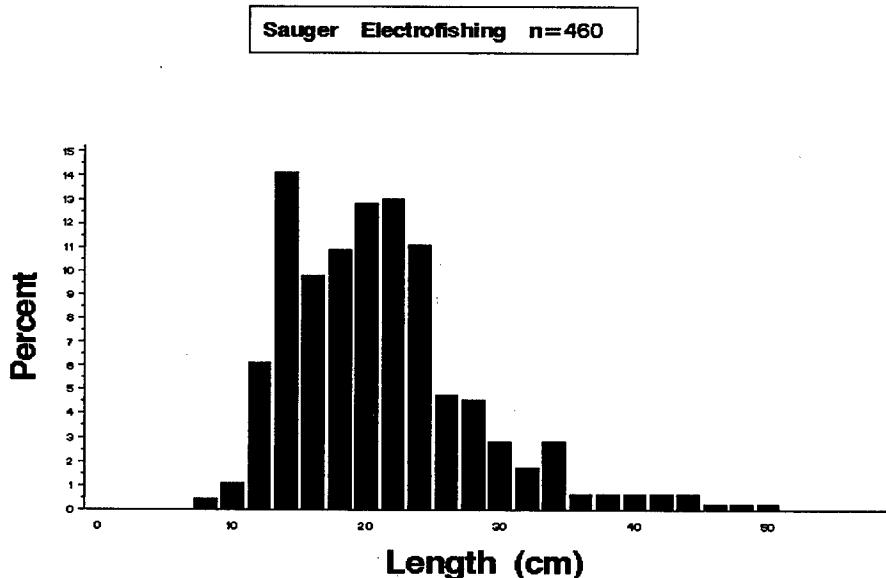


Figure 3.13. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

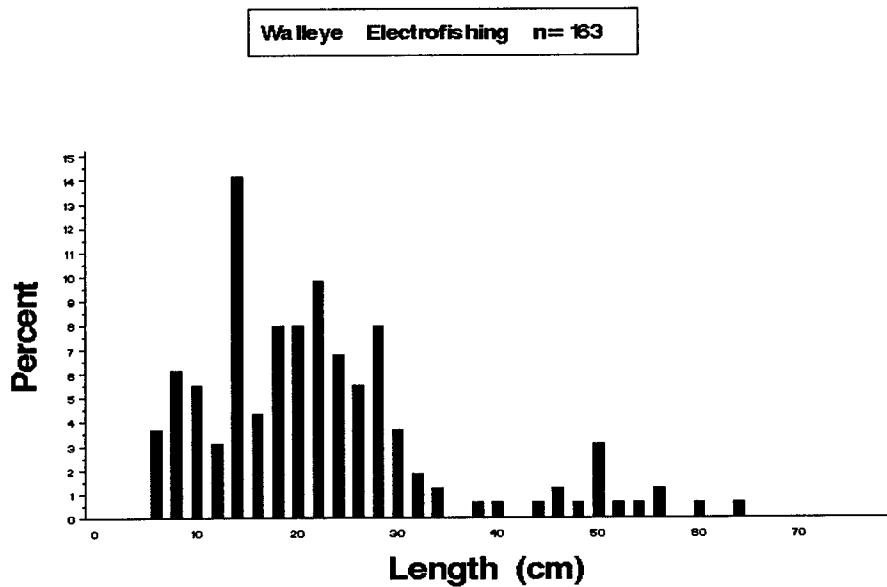


Figure 3.14. Length distributions (*length*) as a percentage of catch (*percent*) for walleye (*Stizostedion vitreum*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

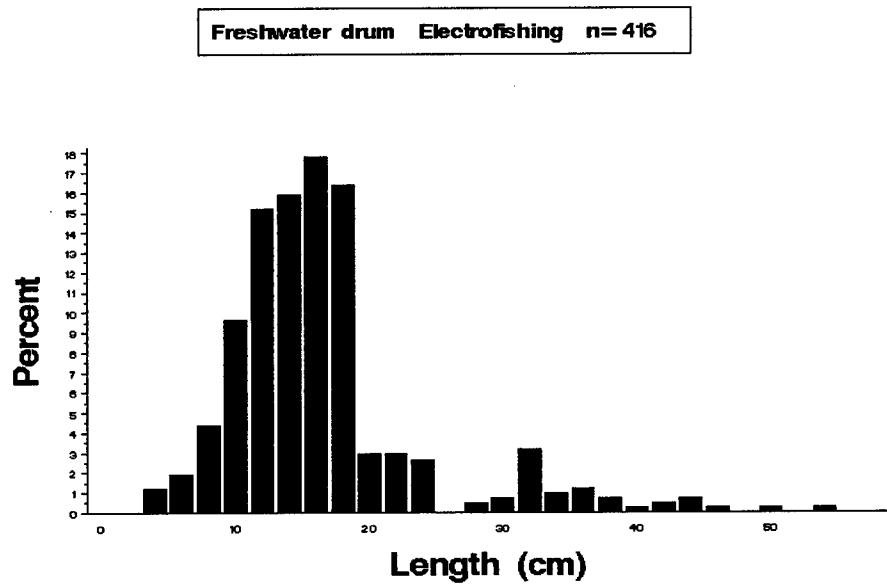


Figure 3.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplochiton grunniens*) collected by electrofishing in Upper Mississippi River Pool 13 during 1998.

Chapter 4. Pool 26, Upper Mississippi River

by

Frederick A. Cronin

Illinois Natural History Survey
LTRMP Great Rivers Field Station
8450 Montclair
Brighton, Illinois 62012

Hydrograph

Water levels at Pool 26 are influenced by discharge from the Mississippi, Illinois, and Missouri Rivers. The pool is regulated at a midpool control point by the U.S. Army Corps of Engineers. These factors combine to give Pool 26 a highly fluctuating hydrologic regime. Three sets of hydrographs are shown to accurately represent these fluctuations (Figure 4.1). The gages represented are located at Lock and Dam 25 tailwater (Winfield Gage), midpool (Grafton Gage), and Lock and Dam 26 impoundment (Alton Gage).

Daily water levels at the Winfield Gage show two significant spring flood pulses. Daily water levels fluctuated in fall and winter with several brief periods of high water. Daily water levels at the Grafton Gage show the same two spring flood pulses as the Winfield Gage, with relatively stable

water levels near the 1940–97 mean the rest of the year. The Alton Gage shows only one spring flood pulse above the flood stage. Water levels fluctuated greatly from March to July with several periods of water levels below the 1940–97 mean. Brief periods of low water occurred again in October and November. Water levels caused minor sampling problems in the first period but had little effect on the rest of the sampling season. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

Summary of Sampling Effort

A total of 370 samples were collected in 1998—115 from period 1, 126 from period 2, and 129 from period 3 (Table 4.1). Of those, 352 were from randomly selected sites in the BWCS, BWC0,

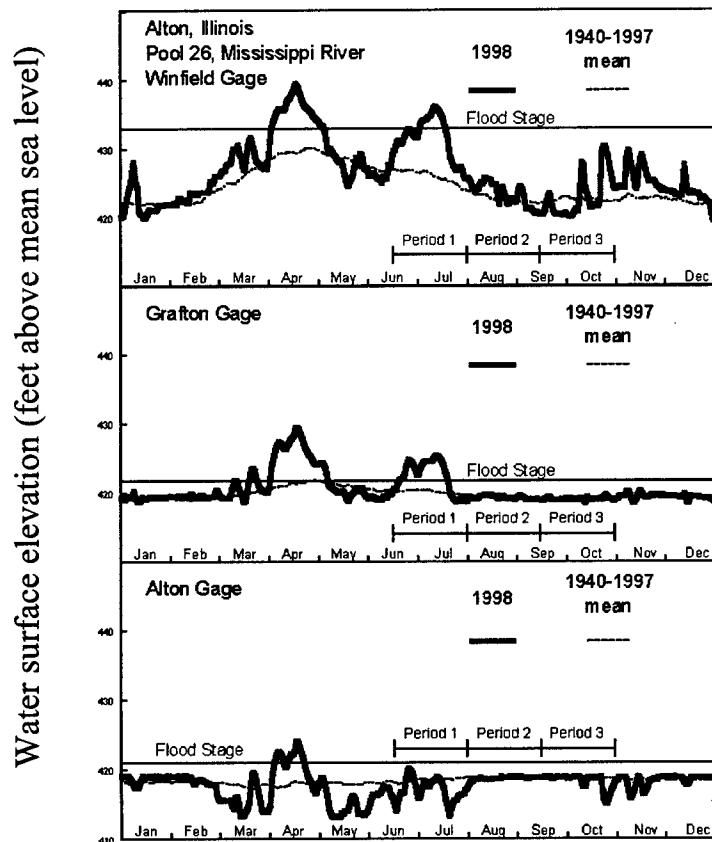


Figure 4.1. Daily water surface elevation from Winfield, Grafton, and Alton Gages for Pool 26, Upper Mississippi River, during 1998 and mean elevation since 1940. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

SCB, MCBU, MCBW, IMPS, and IMPO strata and 18 were from fixed sites in the TWZ stratum.

Total Catch by Gear

During the 1998 field season, 29,666 fish were collected representing 63 species and 2 hybrids (Table 4.2). The five most numerically abundant species were gizzard shad (11,295), emerald shiner (5,007), western mosquitofish (3,689), freshwater drum (1,821), and common carp (1,172). The total number of fish and species (excluding hybrids) collected by gear type were day electrofishing, 12,650 fish of 45 species; night electrofishing, 1,156 fish of 21 species; fyke nets, 465 fish of 23 species; tandem fyke nets, 337 fish of 17 species; mini fyke nets, 7,893 fish of 41 species; tandem mini fyke nets, 1,056 fish of 23 species; seines, 4,794 fish of 32 species; small hoop nets, 643 fish of 13 species; large hoop nets, 534 fish of 18 species; trammel nets, 38 fish of 11 species; and trawls, 100 fish of 8 species.

Random Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 4.3.1), gizzard shad had the highest C/f in all strata combined (100.51), followed by common carp (13.78) and freshwater drum (7.07). Gizzard shad had the highest C/f in the BWCS stratum (94.11), followed by orangespotted sunfish (22.00) and emerald shiner (11.11). Gizzard shad had the highest C/f in the IMPS stratum (65.33), followed by bluegill (50.17) and orangespotted sunfish (10.08). Gizzard shad had the highest C/f in the MCBU stratum (128.00), followed by common carp (13.68) and emerald shiner and white bass (each with 3.32). Gizzard shad had the highest C/f in the MCBW stratum (354.50), followed by common carp (27.67) and white bass (10.50). Gizzard shad had the highest C/f in the SCB stratum (38.22), followed by freshwater drum (16.94) and common carp (15.39).

Fyke Netting

For fyke netting (Table 4.3.2), white bass had the highest C/f in all strata combined (11.86), followed by shortnose gar (3.85) and freshwater drum (2.16). In the BWCS stratum, shortnose gar had the highest C/f (8.91), followed by white bass (2.98) and gizzard shad (1.47). In the IMPS stratum, black crappie had the highest C/f (5.39), followed by bluegill (4.73) and white crappie (3.80). In the SCB stratum, white bass had the highest C/f (13.42), followed by shortnose gar (3.21) and freshwater drum (2.32).

Tandem Fyke Net

For tandem fyke netting (Table 4.3.3), gizzard shad had the highest C/f in all strata combined (3.37), followed by white bass (3.24) and freshwater drum (1.97). White bass had the highest C/f in the BWC stratum (4.40), followed by shortnose gar (2.47) and gizzard shad (2.06). Gizzard shad had the highest C/f in the IMPO stratum (4.29), followed by freshwater drum (3.00) and white bass (2.43).

Mini Fyke Net

For mini fyke netting (Table 4.3.4), emerald shiner had the highest C/f in all strata combined (15.68), followed by freshwater drum (15.64) and western mosquitofish (13.95). Western mosquitofish had the highest C/f in the BWCS stratum (333.94), followed by emerald shiner (104.74) and orangespotted sunfish (8.72). Emerald shiner had the highest C/f in the IMPS stratum (72.24), followed by bullhead minnow (8.80) and channel shiner (6.21). Emerald shiner had the highest C/f in the MCBU stratum (7.99), followed by channel catfish (4.45) and channel shiner (3.97). Emerald shiner had the highest C/f in the MCBW stratum (26.92), followed by channel shiner (6.18) and white bass (5.64). Freshwater drum had the highest C/f in the SCB stratum (53.53), followed by emerald shiner (19.37) and channel shiner (8.28).

Tandem Mini Fyke Net

For tandem mini fyke netting (Table 4.3.5), emerald shiner had the highest *C/f* in all strata combined (10.93), followed by gizzard shad (9.80) and freshwater drum (7.71). Emerald shiner had the highest *C/f* in the BWCO stratum (25.34), followed by freshwater drum (16.96) and gizzard shad (10.57). Gizzard shad had the highest *C/f* in the IMPO stratum (9.26), followed by channel catfish (1.94) and white bass (1.93).

Small Hoop Net

For small hoop netting (Table 4.3.6), channel catfish had the highest *C/f* in all strata combined (5.76), followed by common carp (0.37) and smallmouth buffalo (0.23). River carpsucker had the highest *C/f* in the BWCO stratum (0.70), followed by common carp (0.51) and smallmouth buffalo and channel catfish (each with 0.34). Channel catfish had the highest *C/f* in the IMPO stratum (1.98), followed by common carp (1.12) and freshwater drum (0.25). Channel catfish had the highest *C/f* in the MCBU stratum (3.90), followed by smallmouth buffalo (0.18) and freshwater drum (0.18). Channel catfish had the highest *C/f* in the MCBW stratum (5.47), followed by freshwater drum (0.34) and common carp, white bass, and bluegill (each with 0.17). Channel catfish had the highest *C/f* in the SCB stratum (10.77), followed by common carp (0.85) and smallmouth buffalo (0.35).

Large Hoop Net

For large hoop netting (Table 4.3.7), smallmouth buffalo had the highest *C/f* in all strata combined (2.45), followed by channel catfish (0.65) and common carp and freshwater drum (each with 0.38). Gizzard shad had the highest *C/f* in the BWCO stratum (1.44), followed by river carpsucker (1.07) and smallmouth buffalo (0.81). Smallmouth buffalo had the highest *C/f* in the IMPO stratum (7.10), followed by common carp (1.45) and river carpsucker (1.20). Smallmouth buffalo had the highest *C/f* in the MCBU stratum (2.17), followed by channel catfish (0.74) and freshwater drum (0.49). Common carp had the highest *C/f* in the MCBW stratum (1.47), followed by smallmouth

buffalo (0.34) and skipjack herring, gizzard shad, and bluegill (each with 0.17). Smallmouth buffalo had the highest *C/f* in the SCB stratum (2.80), followed by common carp (0.64) and channel catfish (0.51).

Seine

For seining (Table 4.3.8), emerald shiner had the highest *C/f* in all strata combined (29.44), followed by gizzard shad (23.12) and channel shiner (1.38). Emerald shiner also had the highest *C/f* in the MCBU stratum (33.55), followed by gizzard shad (19.66) and unidentified minnows (1.91). In the SCB stratum, gizzard shad had the highest *C/f* (31.19), followed by emerald shiner (19.88) and brook silversides (1.88).

Trammel Net

For trammel netting (Table 4.3.9), the IMPO was the only stratum sampled. Freshwater drum had the highest *C/f* (2.25), followed by common carp (1.96) and skipjack herring (0.50).

Fixed Sampling, Mean *C/f* by Gear and Stratum

Night Electrofishing

For night electrofishing (Table 4.4.1), the TWZ was the only stratum sampled. Gizzard shad had the highest *C/f* (132.67), followed by common carp (19.17) and white bass (14.33).

Trawl

For trawling (Table 4.4.2), the TWZ was the only stratum sampled. Channel catfish had the highest *C/f* (3.75), followed by freshwater drum (2.75) and shovelnose sturgeon (0.58).

Length Distributions of Selected Species

Length distributions are presented for selected species in Figures 4.2 to 4.14. The length distributions for some gears may be limited by the size selectiveness of the particular gear. Length

distributions of small samples ($n < 100$) may be included but are not statistically meaningful (Anderson and Neumann 1996).

Gizzard Shad

The electrofishing length distribution of 8,905 gizzard shad (Figure 4.2) indicates many fish between 4 and 12 cm, with a mode of 6 cm. This length group probably represents young-of-the-year fish.

Common Carp

The electrofishing length distribution of 1,004 common carp (Figure 4.3) indicates few fish smaller than 34 cm with most fish between 34 and 50 cm.

Smallmouth Buffalo

The electrofishing length distribution of 160 smallmouth buffalo (Figure 4.4) indicates a bimodal distribution. The first group represents young fish between 8 and 20 cm, with a mode of 14 cm, and the larger group represents larger fish between 20 and 46 cm, with a mode of 32 cm. The hoop net length distribution of 301 smallmouth buffalo (Figure 4.5) indicates a similar group of larger fish, with a mode of 32 cm.

Channel Catfish

The electrofishing length distribution of 208 channel catfish (Figure 4.6) indicates a group of age 0 fish between 4 and 10 cm, with a mode of 6 cm. The remainder are spread between 14 and 62 cm, with a mode of 38 cm. The hoop net length distribution of 569 channel catfish (Figure 4.7) indicates many fish between 12 and 40 cm, with a mode of 16 cm. There are also fish as long as 70 cm.

White Bass

The electrofishing length distribution of 427 white bass (Figure 4.8) indicates a distribution between 0 and 40 cm, with a mode of 8 cm.

Bluegill

The electrofishing length distribution of 751 bluegills (Figure 4.9) indicates a distribution between 0 and 16 cm, with a mode of 60 cm. The fyke net length distribution of 73 bluegills (Figure 4.10) indicates a larger size distribution, with fish ranging from 6 to 18 cm and a mode of 8 cm.

Largemouth Bass

The electrofishing length distribution of 47 largemouth bass (Figure 4.11) indicates fish ranging from 4 to 46 cm, with most fish in the smaller size groups near the mode of 12 cm.

Black Crappie

The fyke netting length distribution of 41 black crappies (Figure 4.12) indicates a distribution between 6 and 26 cm, with a mode of 14 cm.

Sauger

The electrofishing length distribution of 41 sauger (Figure 4.13) indicates fish between 2 and 46 cm, with no clear size classes.

Freshwater Drum

The electrofishing length distribution of 494 freshwater drum (Figure 4.14) indicates fish from 0 to 58 cm, with most fish in the smaller length groups near the mode of 12 cm.

Table 4.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in Pool 26 of the Mississippi River during 1998. Table entries are numbers of successfully completed standardized monitoring collections.

Table page: 1

Sampling period=1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		6	8	2	4				26
Fyke net	4		1			2				7
Large hoop net		2	5	8			2			17
Small hoop net		2	3	8			2			15
Mini fyke net	4		5			3				12
Night electrofishing									2	2
Seine			10	12					4	22
Trawling										4
Trammel net (set)							2			2
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	14	8	30	36	2	9	10	0	6	115

Sampling period=2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		6	7	2	4				25
Fyke net	4		2			2				8
Large hoop net		2	5	8	1		2			18
Small hoop net		2	5	8	1		2			18
Mini fyke net	4		5	2	2	2				15
Night electrofishing									2	2
Seine			10	16					4	26
Trawling										4
Trammel net (set)							2			2
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	14	8	33	41	6	8	10	0	6	126

Sampling period=3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	6		6	7	2	4				25
Fyke net	4		2			2				8
Large hoop net		2	5	8	2		2			19
Small hoop net		2	5	7	2		2			18
Mini fyke net	4		5	2	2	2				15
Night electrofishing									2	2
Seine			12	16					4	28
Trawling										2
Trammel net (set)							2			4
Tandem fyke net		2					2			4
Tandem mini fyke net		2					2			4
SUBTOTAL	14	8	35	40	8	8	10	0	6	129
	====	====	==	====	====	====	====	==	==	=====
	42	24	98	117	16	25	30	0	18	370

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 4.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 26 of the Mississippi River. See Table 4.1 for the list of sampling gears actually deployed in this study reach.

Table page:

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
2	Lake sturgeon	<i>Acipenser fulvescens</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
3	Shovelnose sturgeon	<i>Scaphirhynchus platorynchus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
4	Paddlefish	<i>Polyodon spathula</i>	-	-	-	-	-	-	-	-	-	-	-	-	7
5	Spotted gar	<i>Lepisosteus osseus</i>	2	-	-	6	2	-	-	-	-	-	-	-	2
6	Longnose gar	<i>Lepisosteus platostomus</i>	7	4	-	-	-	-	-	-	-	-	-	-	10
7	Shortnose gar	<i>Lepisosteus platostomus</i>	60	38	129	47	43	21	6	1	2	1	-	-	11
8	Bowfin	<i>Amia calva</i>	-	-	2	-	5	-	-	-	-	-	-	-	348
9	Goideye	<i>Hiodon alosoides</i>	3	-	-	-	-	-	-	-	-	-	-	-	12
10	Mooneye	<i>Hiodon tergisus</i>	1	-	-	-	-	-	-	-	-	-	-	-	7
11	Skipjack herring	<i>Alosa chrysocloris</i>	80	4	-	-	-	-	-	-	-	-	-	-	92
12	Gizzard shad	<i>Dorosoma cepedianum</i>	81,09	796	24	74	165	235	1863	1	22	1	5	1	11295
13	Threadfin shad	<i>Dorosoma petenense</i>	14	-	-	-	22	7	5	-	-	-	-	-	48
14	Central stoneroller	<i>Campostoma anomalum</i>	-	-	-	3	-	-	-	-	-	-	-	-	3
15	Goldfish	<i>Carassius auratus</i>	-	-	-	1	-	-	-	-	-	-	-	-	1
16	Grass carp	<i>Ctenopharyngodon idella</i>	2	-	-	-	1	-	-	-	-	-	-	-	4
17	Red shiner	<i>Cyprinella lutrensis</i>	-	-	-	-	1	-	-	-	-	-	-	-	8
18	Spotfin shiner	<i>Cyprinella spiloptera</i>	31	-	-	44	-	-	-	-	-	-	-	-	96
19	Common carp	<i>Cyprinus carpio</i>	889	115	29	7	8	5	-	60	11	-	-	-	1172
20	Carp x goldfish hybrid	<i>Cyprinus carpio x auratus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
21	Mississippi silvery minnow	<i>Hybognathus musthalis</i>	1	-	-	4	-	-	-	-	-	-	-	-	14
22	Silver carp	<i>Hypophthalmichthys molitrix</i>	2	-	-	-	-	-	-	-	-	-	-	-	2
23	Bighead carp	<i>Hypophthalmichthys nobilis</i>	-	-	2	3	-	1	3	-	10	-	-	-	19
24	Speckled chub	<i>Macropodus aestivalis</i>	-	-	1	-	3	7	4	-	-	-	-	-	19
25	Silver chub	<i>Macropybopsis storriiana</i>	28	-	-	-	29	18	24	-	-	-	-	-	99
26	Golden shiner	<i>Notemigonus crysoleucas</i>	-	-	-	-	29	-	-	-	-	-	-	-	3
27	Emerald shiner	<i>Notropis atherinoides</i>	479	21	-	-	2081	314	2112	-	-	-	-	-	5007
28	River shiner	<i>Notropis blennius</i>	14	-	-	-	8	-	103	-	-	-	-	-	125
29	Bigmouth shiner	<i>Notropis dorsalis</i>	-	-	-	-	-	-	2	-	-	-	-	-	2
30	Spottail shiner	<i>Notropis hudsonius</i>	-	-	-	-	-	-	1	-	-	-	-	-	1
31	Silverband shiner	<i>Notropis shumardi</i>	10	-	-	-	29	33	7	-	-	-	-	-	79
32	Sand shiner	<i>Notropis stramineus</i>	-	-	-	-	4	-	6	-	-	-	-	-	10
33	Channel shiner	<i>Notropis wickliffei</i>	33	1	-	-	218	1	91	-	-	-	-	-	344
34	Bluntnose minnow	<i>Pimephales notatus</i>	-	-	-	-	4	-	2	-	-	-	-	-	6
35	Bullhead minnow	<i>Pimephales Vigilax</i>	64	-	-	-	102	32	33	-	-	-	-	-	231
36	Unidentified minnow	Unidentified Cyprinidae	-	-	-	-	-	-	84	-	-	-	-	-	84
37	River carp sucker	<i>Carpoides carpio</i>	61	3	9	5	4	13	28	10	27	-	-	-	160
38	Quillback	<i>Carpoides cyprinus</i>	3	-	-	2	-	-	-	-	-	-	-	-	5
39	Blue sucker	<i>Cycloleptus elongatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting

S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 4.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in Pool 26 of the Mississippi River. See Table 4.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Smallmouth buffalo	<i>Ictiobus bubalus</i>	137	23	12	18	3	2	3	23	278	-	-	1	500
41	Bigmouth buffalo	<i>Ictiobus cyprinellus</i>	20	3	5	-	2	-	-	9	-	-	-	1	39
42	Black buffalo	<i>Ictiobus niger</i>	13	-	-	-	-	-	-	2	-	-	-	1	18
43	Unidentified buffalo	<i>Ictiobus</i> sp.	32	-	-	-	-	-	25	4	-	-	-	-	159
44	Golden redhorse	<i>Moxostoma erythrurum</i>	2	-	-	-	-	-	-	-	-	-	-	-	2
45	Shortnose redhorse	<i>Moxostoma macrolepidotum</i>	28	-	-	2	2	-	-	-	-	-	-	-	34
46	Brown bullhead	<i>Ameiurus nebulosus</i>	-	-	1	-	-	-	-	-	-	-	-	-	1
47	Blue catfish	<i>Ictalurus punctatus</i>	206	2	5	6	44	23	45	513	56	-	2	45	947
48	Channel catfish	<i>Ictalurus</i> sp.	29	8	1	-	-	-	-	9	15	-	-	1	65
49	Flathead catfish	<i>Pylodictis olivaris</i>	29	3	-	-	-	-	3567	-	-	-	-	-	3689
50	Western mosquitofish	<i>Gambusia affinis</i>	8	-	-	-	-	-	8	83	-	-	-	-	99
51	Brook silverside	<i>Labidesthes sicculus</i>	341	86	103	83	179	58	65	7	6	-	-	-	928
52	White bass	<i>Morone chrysops</i>	-	-	1	-	-	-	-	-	-	-	-	-	25
53	Green sunfish	<i>Lepomis cyanellus</i>	22	-	-	-	-	-	-	-	-	-	-	-	24
54	Walimouth	<i>Lepomis gibbosus</i>	19	-	-	-	5	-	-	-	-	-	-	-	678
55	Orangespotted sunfish	<i>Lepomis humilis</i>	536	-	1	1	113	15	12	-	-	-	-	-	942
56	Bluegill	<i>Lepomis macrochirus</i>	745	6	38	35	89	18	8	2	1	-	-	-	1
57	Green x bluegill sunfish	<i>L. cyanellus x macrochirus</i>	-	-	-	-	1	-	-	-	-	-	-	-	73
58	Largemouth bass	<i>Micropterus salmoides</i>	46	1	1	22	-	2	-	-	-	-	-	-	76
59	White crappie	<i>Pomoxis annularis</i>	9	3	25	5	25	7	2	-	-	-	-	-	105
60	Black crappie	<i>Pomoxis nigromaculatus</i>	22	8	34	7	29	4	-	-	-	-	-	-	53
61	Mud darter	<i>Etheostoma asprigene</i>	-	-	-	1	-	-	-	-	-	-	-	-	1
62	Loggerhead darter	<i>Percina caprodes</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
63	Slenderhead darter	<i>Percina phoxocephala</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
64	River darter	<i>Percina shumardi</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
65	Sauger	<i>Stizostedion canadense</i>	33	8	1	-	9	1	-	-	-	-	-	-	5
66	Walleye	<i>Stizostedion vitreum</i>	3	1	-	-	-	-	1	-	-	-	-	-	1821
67	Freshwater drum	<i>Aploinotus grunniens</i>	472	22	32	40	880	215	62	21	31	-	-	-	33
68	Unidentified	-	-	-	-	-	29	-	-	-	-	-	-	-	29
			12650	1156	465	337	7893	1056	4794	643	534	0	38	100	29666

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting
 S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 4.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Chestnut lamprey	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Spotted gar	0.00 (0.00)	0.11 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Longnose gar	0.13 (0.09)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.33 (0.28)
Shortnose gar	0.74 (0.19)	0.89 (0.35)	0.25 (0.13)	0.36 (0.19)	0.67 (0.21)	1.61 (0.49)
Goldeye	0.08 (0.04)	0.00 (0.00)	0.00 (0.00)	0.09 (0.06)	0.00 (0.00)	0.06 (0.06)
Mooneye	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Skipjack herring	0.82 (0.31)	0.17 (0.09)	1.25 (0.59)	0.68 (0.40)	4.17 (2.04)	1.22 (0.58)
Gizzard shad	100.51 (27.85)	94.11 (22.90)	65.33 (11.11)	128.00 (41.60)	354.50 (131.82)	38.22 (11.69)
Threadfin shad	0.13 (0.09)	0.17 (0.12)	0.50 (0.29)	0.18 (0.14)	0.17 (0.17)	0.00 (0.00)
Grass carp	0.02 (0.02)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Spotfin shiner	0.24 (0.07)	0.39 (0.16)	1.17 (0.64)	0.18 (0.08)	0.00 (0.00)	0.33 (0.14)
Common carp	13.78 (3.66)	6.28 (1.28)	2.67 (0.64)	13.68 (4.98)	27.67 (14.41)	15.39 (5.54)
Carp x goldfish hybrid	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Mississippi silvery minnow	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Silver carp	0.03 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.11 (0.08)
Silver chub	0.50 (0.24)	0.00 (0.00)	0.42 (0.26)	0.41 (0.21)	0.00 (0.00)	0.78 (0.66)
Emerald shiner	4.19 (0.59)	11.11 (3.46)	5.58 (2.33)	3.32 (0.77)	7.50 (4.70)	5.22 (0.94)
River shiner	0.06 (0.03)	0.00 (0.00)	0.92 (0.65)	0.00 (0.00)	0.00 (0.00)	0.17 (0.09)
Silverband shiner	0.02 (0.02)	0.50 (0.50)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Channel shiner	0.49 (0.20)	0.00 (0.00)	0.58 (0.43)	0.23 (0.11)	0.00 (0.00)	1.17 (0.65)
Bullhead minnow	0.21 (0.07)	1.06 (0.36)	3.25 (1.61)	0.14 (0.10)	0.00 (0.00)	0.17 (0.09)
River carpsucker	0.49 (0.17)	0.44 (0.20)	2.67 (2.04)	0.41 (0.23)	0.17 (0.17)	0.61 (0.23)
Quillback	0.03 (0.03)	0.00 (0.00)	0.17 (0.11)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	1.24 (0.27)	2.39 (0.53)	1.83 (0.49)	1.00 (0.35)	3.50 (1.34)	1.61 (0.49)
Bigmouth buffalo	0.10 (0.05)	0.50 (0.19)	0.67 (0.36)	0.09 (0.06)	0.00 (0.00)	0.06 (0.06)
Black buffalo	0.10 (0.05)	0.44 (0.17)	0.08 (0.08)	0.05 (0.05)	0.00 (0.00)	0.17 (0.12)
Unidentified buffalo	0.04 (0.02)	0.56 (0.35)	1.83 (1.38)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Golden redhorse	0.03 (0.03)	0.00 (0.00)	0.08 (0.08)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Shorthead redhorse	0.27 (0.11)	0.00 (0.00)	1.17 (0.99)	0.18 (0.14)	0.17 (0.17)	0.50 (0.19)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 4.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by day electrofishing in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Channel catfish	2.68 (0.49)	1.78 (0.40)	3.42 (1.15)	2.27 (0.60)	2.67 (1.33)	3.72 (0.96)
Flathead catfish	0.42 (0.14)	0.11 (0.08)	0.83 (0.39)	0.50 (0.19)	0.17 (0.17)	0.28 (0.14)
Western mosquitofish	0.13 (0.06)	1.39 (0.84)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.17 (0.12)
Brook silverside	0.06 (0.03)	0.33 (0.16)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.06 (0.06)
White bass	3.73 (0.67)	3.11 (0.48)	5.33 (1.65)	3.32 (0.83)	10.50 (4.68)	4.72 (1.30)
Green sunfish	0.02 (0.01)	0.28 (0.14)	1.17 (0.68)	0.00 (0.00)	0.50 (0.34)	0.00 (0.00)
Warmouth	0.04 (0.02)	0.44 (0.29)	0.83 (0.52)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Orangespotted sunfish	1.35 (0.25)	22.00 (5.48)	10.08 (4.51)	0.32 (0.12)	0.17 (0.17)	0.61 (0.31)
Bluegill	1.63 (0.39)	5.28 (1.50)	50.17 (20.47)	1.27 (0.50)	2.17 (0.70)	0.39 (0.20)
Largemouth bass	0.12 (0.05)	0.06 (0.06)	2.58 (0.67)	0.09 (0.06)	1.67 (1.28)	0.11 (0.08)
White crappie	0.03 (0.02)	0.22 (0.10)	0.17 (0.11)	0.00 (0.00)	0.33 (0.33)	0.06 (0.06)
Black crappie	0.02 (0.01)	0.28 (0.14)	1.42 (0.61)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Logperch	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Slenderhead darter	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
River darter	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Sauger	0.43 (0.12)	0.06 (0.06)	0.92 (0.31)	0.27 (0.13)	0.00 (0.00)	0.83 (0.26)
Walleye	0.03 (0.03)	0.00 (0.00)	0.17 (0.11)	0.05 (0.05)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	7.07 (2.24)	2.67 (0.84)	3.58 (1.50)	3.14 (0.96)	1.17 (0.60)	16.94 (7.53)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 4.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	SCB
Spotted gar	0.25 (0.20)	0.42 (0.26)	0.00 (0.00)	0.23 (0.23)
Shortnose gar	3.85 (1.74)	8.91 (4.11)	1.61 (1.04)	3.21 (1.96)
Bowfin	0.21 (0.20)	0.08 (0.08)	0.00 (0.00)	0.23 (0.23)
Skipjack herring	0.20 (0.19)	0.08 (0.08)	0.00 (0.00)	0.22 (0.22)
Gizzard shad	0.39 (0.21)	1.47 (0.64)	0.91 (0.91)	0.22 (0.22)
Common carp	1.74 (1.15)	0.65 (0.28)	2.36 (1.57)	1.87 (1.34)
Bighead carp	0.02 (0.02)	0.15 (0.15)	0.00 (0.00)	0.00 (0.00)
River carpsucker	0.08 (0.03)	0.57 (0.28)	0.35 (0.22)	0.00 (0.00)
Smallmouth buffalo	0.10 (0.04)	0.64 (0.28)	0.72 (0.72)	0.00 (0.00)
Bigmouth buffalo	0.23 (0.20)	0.17 (0.17)	0.35 (0.22)	0.23 (0.23)
Shorthead redhorse	0.02 (0.01)	0.09 (0.09)	0.18 (0.18)	0.00 (0.00)
Brown bullhead	0.01 (0.01)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.61 (0.24)	0.09 (0.09)	0.18 (0.18)	0.70 (0.29)
Flathead catfish	0.01 (0.01)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
White bass	11.86 (8.24)	2.98 (1.56)	1.73 (0.77)	13.42 (9.65)
Green sunfish	0.01 (0.01)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Orangespotted sunfish	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Bluegill	0.23 (0.10)	0.88 (0.66)	4.73 (2.24)	0.00 (0.00)
Largemouth bass	0.21 (0.21)	0.00 (0.00)	0.00 (0.00)	0.24 (0.24)
White crappie	0.14 (0.08)	0.33 (0.19)	3.80 (3.02)	0.00 (0.00)
Black crappie	0.37 (0.20)	0.25 (0.13)	5.39 (2.47)	0.22 (0.22)
Sauger	0.00 (0.00)	0.00 (0.00)	0.18 (0.18)	0.00 (0.00)
Freshwater drum	2.16 (0.83)	1.15 (0.54)	1.45 (0.87)	2.32 (0.97)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO
Spotted gar	0.07 (0.04)	0.16 (0.10)	0.00 (0.00)
Shortnose gar	1.89 (0.87)	2.47 (0.73)	1.49 (1.39)
Gizzard shad	3.37 (1.75)	2.06 (0.58)	4.29 (2.96)
Goldfish	0.05 (0.05)	0.00 (0.00)	0.09 (0.09)
Common carp	0.29 (0.13)	0.33 (0.17)	0.27 (0.18)
Bighead carp	0.12 (0.07)	0.16 (0.10)	0.09 (0.09)
River carpsucker	0.17 (0.17)	0.41 (0.41)	0.00 (0.00)
Smallmouth buffalo	0.92 (0.76)	0.08 (0.08)	1.51 (1.31)
Shorthead redhorse	0.09 (0.06)	0.08 (0.08)	0.09 (0.09)
Channel catfish	0.24 (0.11)	0.33 (0.10)	0.18 (0.18)
White bass	3.24 (0.71)	4.40 (1.14)	2.43 (0.92)
Orangespotted sunfish	0.05 (0.05)	0.00 (0.00)	0.08 (0.08)
Bluegill	1.62 (1.23)	0.81 (0.25)	2.19 (2.09)
Largemouth bass	0.03 (0.03)	0.07 (0.07)	0.00 (0.00)
White crappie	0.24 (0.11)	0.08 (0.08)	0.35 (0.18)
Black crappie	0.34 (0.16)	0.08 (0.08)	0.52 (0.27)
Freshwater drum	1.97 (1.01)	0.49 (0.31)	3.00 (1.71)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Shortnose gar	0.17 (0.05)	2.66 (0.90)	1.19 (0.73)	0.00 (0.00)	0.30 (0.30)	0.20 (0.11)
Bowfin	0.01 (0.01)	0.00 (0.00)	0.76 (0.76)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	3.09 (1.60)	5.71 (1.98)	3.14 (1.53)	2.54 (2.14)	2.01 (1.17)	4.01 (2.55)
Threadfin shad	0.06 (0.06)	1.42 (1.42)	0.76 (0.50)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Central stoneroller	0.04 (0.04)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.13 (0.13)
Grass carp	0.00 (0.00)	0.00 (0.00)	0.15 (0.15)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Red shiner	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.08)
Spotfin shiner	0.71 (0.35)	2.32 (1.52)	0.30 (0.30)	0.50 (0.50)	0.00 (0.00)	0.99 (0.37)
Common carp	0.09 (0.04)	0.36 (0.21)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.26 (0.15)
Mississippi silvery minnow	0.04 (0.04)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.29 (0.29)	0.13 (0.13)
Speckled chub	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.88 (0.88)	0.00 (0.00)
Silver chub	0.20 (0.13)	2.18 (2.18)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.41 (0.34)
Golden shiner	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.20 (0.20)
Emerald shiner	15.68 (4.89)	104.74 (61.75)	72.24 (54.63)	7.99 (5.96)	26.92 (25.93)	19.37 (4.99)
River shiner	0.07 (0.03)	0.00 (0.00)	0.60 (0.60)	0.00 (0.00)	0.29 (0.29)	0.21 (0.11)
Silverband shiner	0.79 (0.56)	0.75 (0.59)	0.29 (0.29)	0.74 (0.74)	0.29 (0.29)	0.92 (0.92)
Sand shiner	0.03 (0.02)	0.28 (0.28)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.07 (0.07)
Channel shiner	5.14 (2.45)	1.86 (1.60)	6.21 (4.61)	3.97 (3.33)	6.18 (6.18)	8.28 (3.69)
Bluntnose minnow	0.05 (0.04)	0.19 (0.19)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.15 (0.15)
Bullhead minnow	1.39 (0.59)	2.15 (1.11)	8.80 (7.42)	1.49 (0.86)	0.00 (0.00)	0.83 (0.38)
River carpsucker	0.01 (0.01)	0.24 (0.24)	0.00 (0.00)	0.00 (0.00)	0.26 (0.26)	0.00 (0.00)
Quillback	0.01 (0.01)	0.19 (0.19)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.01 (0.01)	0.16 (0.16)	0.00 (0.00)	0.00 (0.00)	0.30 (0.30)	0.00 (0.00)
Bigmouth buffalo	0.00 (0.00)	0.08 (0.08)	0.15 (0.15)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Unidentified buffalo	0.45 (0.20)	5.84 (3.28)	2.99 (1.94)	0.00 (0.00)	0.00 (0.00)	0.67 (0.53)
Shorthead redhorse	0.04 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.13 (0.09)
Channel catfish	3.22 (1.53)	0.19 (0.19)	0.00 (0.00)	4.45 (2.30)	3.23 (2.18)	0.89 (0.25)
Flathead catfish	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.13 (0.13)
Western mosquitofish	13.95 (13.06)	333.94 (330.90)	0.61 (0.61)	0.00 (0.00)	0.00 (0.00)	2.35 (1.55)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam

BWCO - Backwater, contiguous, offshore SCB - Side channel border

IMPS - Impounded, shoreline TRI - Tributary mouth

IMPO - Impounded, offshore TWZ - Tailwater

MCBU - Main channel border, unstructured

Table 4.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	IMPS	MCBU	MCBW	SCB
Brook silverside	0.07 (0.03)	0.43 (0.35)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.20 (0.11)
White bass	4.08 (2.05)	3.08 (1.40)	2.09 (0.69)	3.13 (2.09)	5.64 (3.88)	6.49 (5.28)
Green sunfish	0.04 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.14 (0.10)
Warmouth	0.02 (0.01)	0.44 (0.35)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Orangespotted sunfish	0.47 (0.15)	8.72 (2.93)	0.60 (0.46)	0.00 (0.00)	0.00 (0.00)	0.42 (0.35)
Bluegill	0.56 (0.22)	5.75 (2.88)	1.77 (0.48)	0.25 (0.25)	0.00 (0.00)	0.53 (0.31)
Green x bluegill sunfish	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Largemouth bass	0.40 (0.40)	0.00 (0.00)	0.15 (0.15)	0.00 (0.00)	0.00 (0.00)	1.40 (1.40)
White crappie	0.43 (0.33)	1.09 (0.41)	0.75 (0.60)	0.49 (0.49)	0.52 (0.31)	0.20 (0.20)
Black crappie	0.76 (0.53)	0.25 (0.18)	1.36 (0.86)	0.74 (0.74)	0.30 (0.30)	0.87 (0.73)
Mud darter	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.07 (0.07)
Sauger	0.15 (0.13)	0.00 (0.00)	0.15 (0.15)	0.00 (0.00)	0.00 (0.00)	0.52 (0.45)
Freshwater drum	15.64 (8.37)	4.02 (3.67)	1.98 (1.28)	0.25 (0.25)	1.11 (0.65)	53.53 (29.33)
Unidentified	0.55 (0.55)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.93 (1.93)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO
Shortnose gar	0.73 (0.64)	1.76 (1.56)	0.00 (0.00)
Gizzard shad	9.80 (4.90)	10.57 (3.20)	9.26 (8.07)
Threadfin shad	0.26 (0.14)	0.51 (0.33)	0.08 (0.08)
Common carp	0.17 (0.06)	0.42 (0.16)	0.00 (0.00)
Bighead carp	0.03 (0.03)	0.08 (0.08)	0.00 (0.00)
Speckled chub	0.23 (0.19)	0.57 (0.47)	0.00 (0.00)
Silver chub	0.64 (0.51)	1.43 (1.23)	0.09 (0.09)
Emerald shiner	10.93 (6.47)	25.34 (15.83)	0.86 (0.66)
Spottail shiner	0.03 (0.03)	0.08 (0.08)	0.00 (0.00)
Silverband shiner	1.10 (0.71)	2.68 (1.73)	0.00 (0.00)
Channel shiner	0.05 (0.05)	0.00 (0.00)	0.09 (0.09)
Bullhead minnow	1.33 (0.40)	1.57 (0.75)	1.16 (0.43)
River carpsucker	0.45 (0.41)	1.09 (1.00)	0.00 (0.00)
Smallmouth buffalo	0.07 (0.04)	0.17 (0.11)	0.00 (0.00)
Unidentified buffalo	0.87 (0.59)	2.11 (1.46)	0.00 (0.00)
Channel catfish	1.21 (0.81)	0.17 (0.11)	1.94 (1.39)
White bass	2.42 (1.01)	3.13 (1.62)	1.93 (1.30)
Orangespotted sunfish	0.50 (0.29)	1.22 (0.70)	0.00 (0.00)
Bluegill	0.90 (0.62)	0.08 (0.08)	1.47 (1.05)
White crappie	0.36 (0.30)	0.00 (0.00)	0.61 (0.52)
Black crappie	0.17 (0.10)	0.17 (0.17)	0.17 (0.11)
Sauger	0.05 (0.05)	0.00 (0.00)	0.09 (0.09)
Freshwater drum	7.71 (4.48)	16.96 (10.96)	1.24 (0.30)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO	MCBU	MCBW	SCB
Shortnose gar	0.00 (0.00)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Gizzard shad	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Common carp	0.37 (0.15)	0.51 (0.18)	1.12 (0.37)	0.13 (0.11)	0.17 (0.17)	0.85 (0.45)
River carpsucker	0.02 (0.01)	0.70 (0.22)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.23 (0.07)	0.34 (0.17)	0.17 (0.17)	0.18 (0.08)	0.00 (0.00)	0.35 (0.16)
Black buffalo	0.03 (0.02)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)	0.00 (0.00)	0.04 (0.04)
Blue catfish	0.05 (0.03)	0.00 (0.00)	0.00 (0.00)	0.04 (0.03)	0.00 (0.00)	0.08 (0.08)
Channel catfish	5.76 (1.66)	0.34 (0.17)	1.98 (1.25)	3.90 (1.17)	5.47 (4.76)	10.77 (5.11)
Flathead catfish	0.12 (0.04)	0.00 (0.00)	0.00 (0.00)	0.13 (0.06)	0.00 (0.00)	0.12 (0.06)
White bass	0.04 (0.02)	0.08 (0.08)	0.17 (0.17)	0.02 (0.02)	0.17 (0.17)	0.08 (0.05)
Bluegill	0.00 (0.00)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
White crappie	0.00 (0.00)	0.00 (0.00)	0.18 (0.18)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	0.20 (0.07)	0.17 (0.11)	0.25 (0.17)	0.18 (0.09)	0.34 (0.34)	0.23 (0.13)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 4.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO	IMPO	MCBU	MCBW	SCB
Shortnose gar	0.00 (0.00)	0.17 (0.11)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Goldeye	0.02 (0.02)	0.00 (0.00)	0.60 (0.60)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Skipjack herring	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Gizzard shad	0.05 (0.02)	1.44 (0.79)	0.26 (0.18)	0.02 (0.02)	0.17 (0.17)	0.00 (0.00)
Common carp	0.38 (0.14)	0.33 (0.25)	1.45 (0.93)	0.23 (0.10)	1.47 (1.47)	0.64 (0.42)
Bighead carp	0.02 (0.01)	0.68 (0.31)	0.17 (0.17)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
River carpsucker	0.06 (0.03)	1.07 (0.87)	1.20 (0.76)	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)
Blue sucker	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Smallmouth buffalo	2.45 (0.61)	0.81 (0.71)	7.10 (4.50)	2.17 (0.84)	0.34 (0.34)	2.80 (0.72)
Bigmouth buffalo	0.01 (0.01)	0.70 (0.26)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Black buffalo	0.02 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.07 (0.05)
Blue catfish	0.07 (0.04)	0.00 (0.00)	0.00 (0.00)	0.11 (0.06)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.65 (0.32)	0.36 (0.18)	0.17 (0.17)	0.74 (0.47)	0.00 (0.00)	0.51 (0.30)
Flathead catfish	0.17 (0.05)	0.00 (0.00)	0.08 (0.08)	0.19 (0.07)	0.16 (0.16)	0.13 (0.06)
White bass	0.03 (0.01)	0.25 (0.17)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.07 (0.05)
Bluegill	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Black crappie	0.00 (0.00)	0.00 (0.00)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	0.38 (0.11)	0.00 (0.00)	0.26 (0.26)	0.49 (0.17)	0.00 (0.00)	0.17 (0.08)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 4.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	SCB
Shortnose gar	0.07 (0.03)	0.05 (0.03)	0.13 (0.07)
Mooneye	0.10 (0.06)	0.14 (0.08)	0.00 (0.00)
Skipjack herring	0.03 (0.02)	0.02 (0.02)	0.03 (0.03)
Gizzard shad	23.12 (6.49)	19.66 (6.43)	31.19 (15.66)
Threadfin shad	0.05 (0.04)	0.00 (0.00)	0.16 (0.13)
Grass carp	0.01 (0.01)	0.00 (0.00)	0.03 (0.03)
Red shiner	0.11 (0.11)	0.16 (0.16)	0.00 (0.00)
Spotfin shiner	0.30 (0.14)	0.36 (0.20)	0.16 (0.10)
Mississippi silvery minnow	0.14 (0.09)	0.20 (0.12)	0.00 (0.00)
Bighead carp	0.04 (0.03)	0.05 (0.05)	0.03 (0.03)
Speckled chub	0.06 (0.05)	0.09 (0.07)	0.00 (0.00)
Silver chub	0.28 (0.09)	0.18 (0.10)	0.50 (0.20)
Emerald shiner	29.44 (8.98)	33.55 (12.53)	19.88 (6.76)
River shiner	1.33 (0.60)	1.27 (0.80)	1.47 (0.75)
Bigmouth shiner	0.03 (0.03)	0.05 (0.05)	0.00 (0.00)
Silverband shiner	0.10 (0.06)	0.11 (0.08)	0.06 (0.04)
Sand shiner	0.10 (0.10)	0.14 (0.14)	0.00 (0.00)
Channel shiner	1.38 (0.55)	1.82 (0.79)	0.34 (0.15)
Bluntnose minnow	0.03 (0.03)	0.05 (0.05)	0.00 (0.00)
Bullhead minnow	0.46 (0.19)	0.52 (0.27)	0.31 (0.19)
Unidentified minnow	1.34 (1.25)	1.91 (1.80)	0.00 (0.00)
River carpsucker	0.42 (0.38)	0.55 (0.55)	0.13 (0.06)
Smallmouth buffalo	0.05 (0.03)	0.07 (0.04)	0.00 (0.00)
Unidentified buffalo	0.06 (0.06)	0.09 (0.09)	0.00 (0.00)
Channel catfish	0.61 (0.14)	0.66 (0.19)	0.50 (0.17)
Western mosquitofish	1.26 (0.56)	1.45 (0.76)	0.81 (0.55)
Brook silverside	0.93 (0.41)	0.52 (0.17)	1.88 (1.31)
White bass	0.86 (0.38)	0.89 (0.53)	0.81 (0.22)
Orangespotted sunfish	0.12 (0.08)	0.02 (0.02)	0.34 (0.26)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam

SCB - Side channel border

TRI - Tributary mouth

TWZ - Tailwater

Table 4.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	MCBU	SCB
Bluegill	0.09 (0.04)	0.07 (0.05)	0.16 (0.08)
Largemouth bass	0.02 (0.02)	0.00 (0.00)	0.06 (0.06)
Walleye	0.02 (0.02)	0.02 (0.02)	0.00 (0.00)
Freshwater drum	0.95 (0.54)	1.30 (0.77)	0.16 (0.07)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.3.9. Mean catch-per-unit-effort and (standard error) for fishes collected by using anchored trammel netting in Pool 26 of the Mississippi River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 4.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	IMPO
Paddlefish	0.34 (0.21)	0.34 (0.21)
Shortnose gar	0.17 (0.17)	0.17 (0.17)
Goldeye	0.34 (0.34)	0.34 (0.34)
Skipjack herring	0.50 (0.34)	0.50 (0.34)
Gizzard shad	0.18 (0.18)	0.18 (0.18)
Common carp	1.96 (1.15)	1.96 (1.16)
Black buffalo	0.17 (0.17)	0.17 (0.17)
Channel catfish	0.34 (0.34)	0.34 (0.34)
Flathead catfish	0.17 (0.17)	0.17 (0.17)
Sauger	0.17 (0.17)	0.17 (0.17)
Freshwater drum	2.25 (1.47)	2.25 (1.48)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in Pool 26 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Longnose gar	0.67 (0.33)
Shortnose gar	6.33 (1.82)
Skipjack herring	0.67 (0.49)
Gizzard shad	132.67 (51.37)
Common carp	19.17 (6.39)
Emerald shiner	3.50 (1.23)
Channel shiner	0.17 (0.17)
River carpsucker	0.50 (0.34)
Smallmouth buffalo	3.83 (0.60)
Bigmouth buffalo	0.50 (0.34)
Channel catfish	0.33 (0.21)
Flathead catfish	1.33 (0.61)
Western mosquitofish	0.50 (0.34)
White bass	14.33 (5.28)
Bluegill	1.00 (0.63)
Largemouth bass	0.17 (0.17)
White crappie	0.50 (0.34)
Black crappie	1.33 (0.99)
Sauger	1.33 (1.15)
Walleye	0.17 (0.17)
Freshwater drum	3.67 (1.52)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 4.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in Pool 26 of the Mississippi River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Lake sturgeon	0.08 (0.08)
Shovelnose sturgeon	0.58 (0.23)
Gizzard shad	0.42 (0.19)
Speckled chub	0.42 (0.19)
Smallmouth buffalo	0.08 (0.08)
Blue catfish	0.25 (0.25)
Channel catfish	3.75 (1.31)
Freshwater drum	2.75 (1.47)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

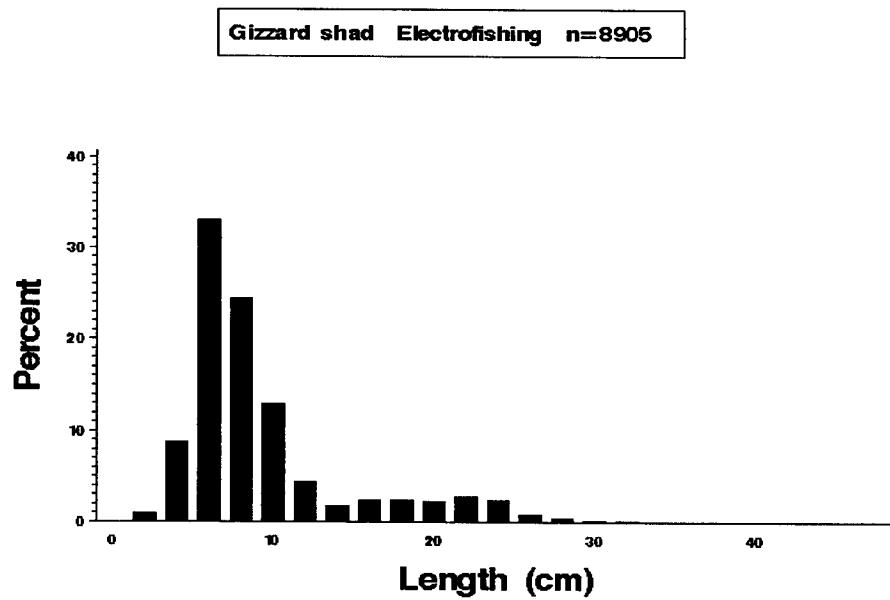


Figure 4.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

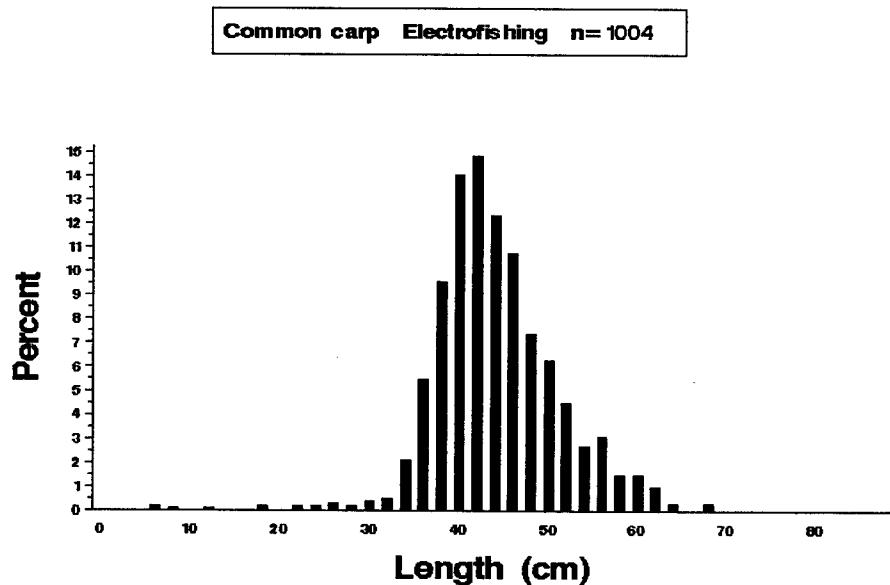


Figure 4.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

Smallmouth buffalo Electrofishing n= 160

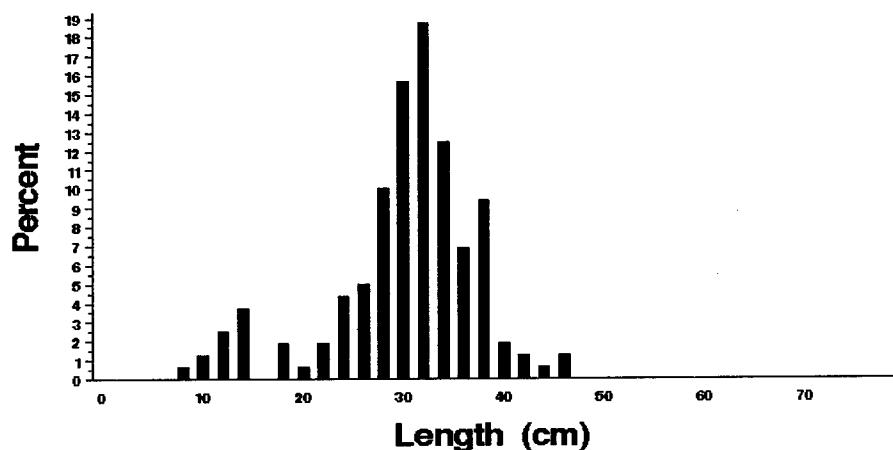


Figure 4.4. Length distributions (length) as a percentage of catch (percent) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

Smallmouth buffalo Hoop nets n= 301

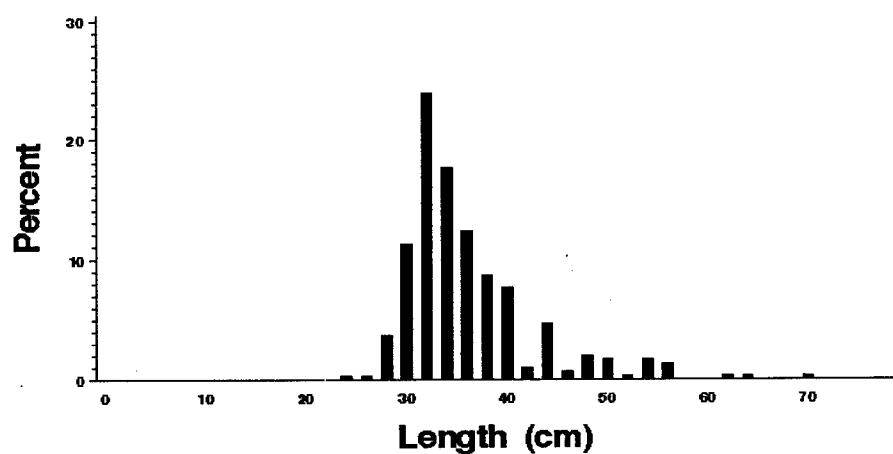


Figure 4.5. Length distributions (length) as a percentage of catch (percent) for smallmouth buffalo (*Ictiobus bubalus*) collected by small and large hoop netting in Upper Mississippi River Pool 26 during 1998.

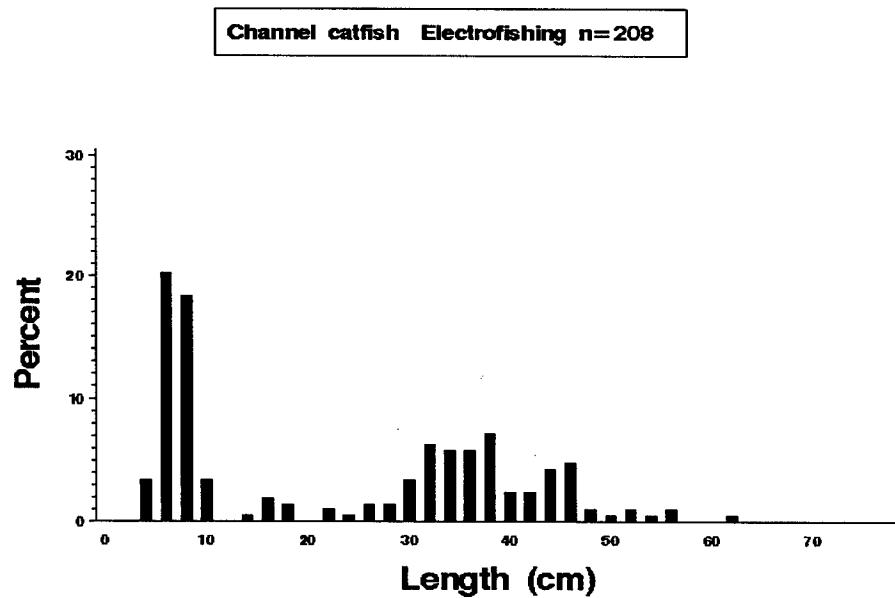


Figure 4.6. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

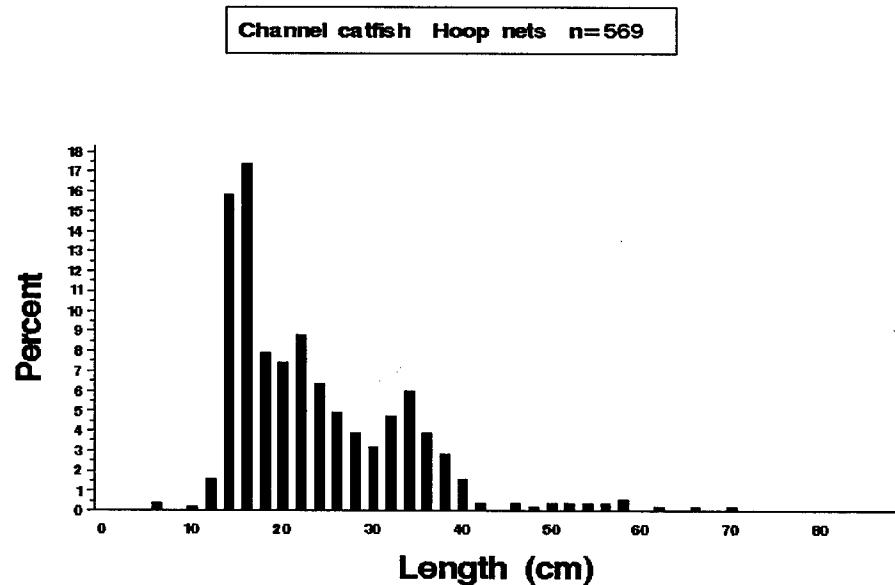


Figure 4.7. Length distributions (*length*) as a percentage of catch (*percent*) for channel catfish (*Ictalurus punctatus*) collected by small and large hoop netting in Upper Mississippi River Pool 26 during 1998.

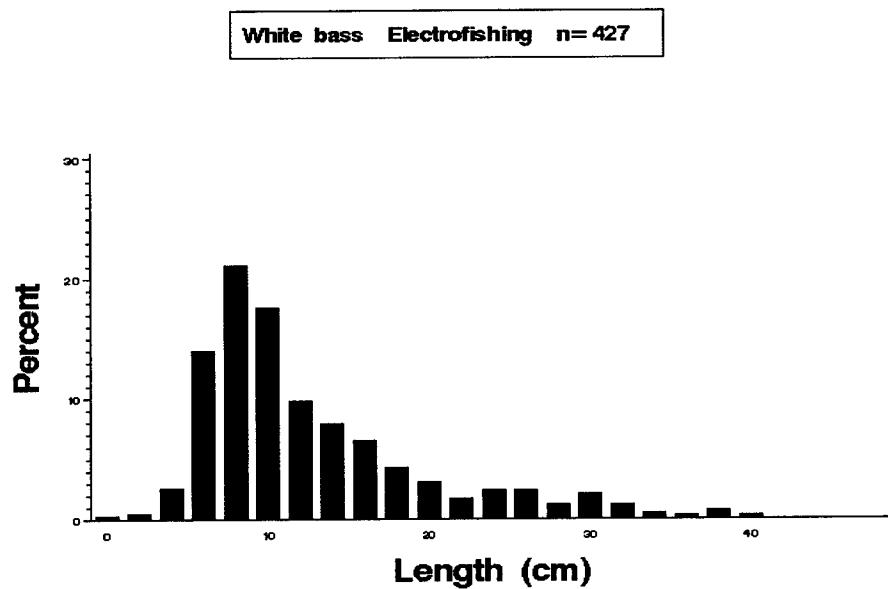


Figure 4.8. Length distributions (*length*) as a percentage of catch (*percent*) for white bass (*Morone chrysops*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

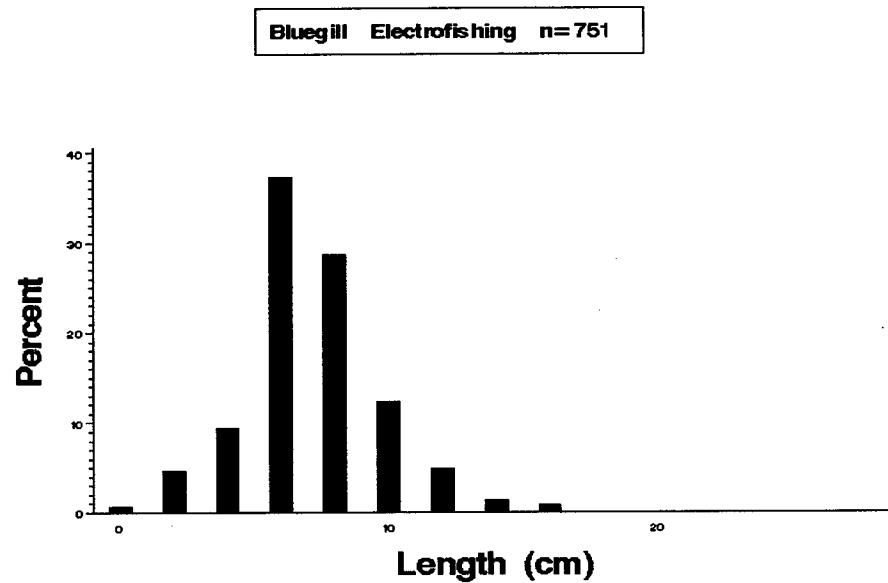


Figure 4.9. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

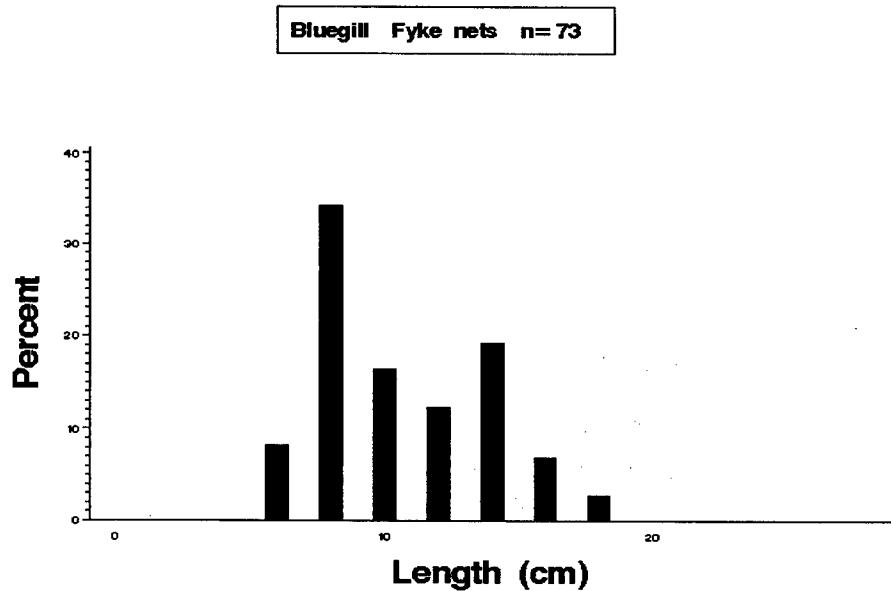


Figure 4.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in Upper Mississippi River Pool 26 during 1998.

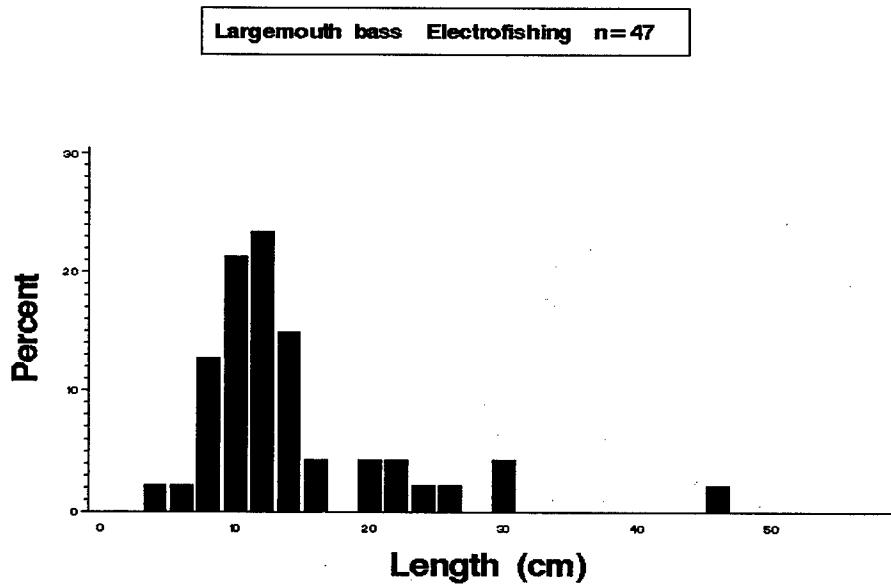


Figure 4.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

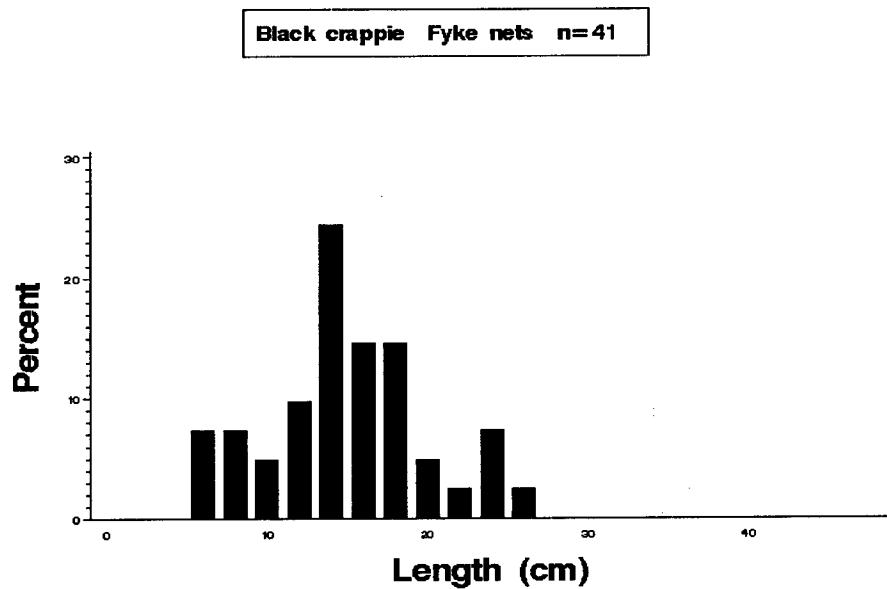


Figure 4.12. Length distributions (*length*) as a percentage of catch (*percent*) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in Upper Mississippi River Pool 26 during 1998.

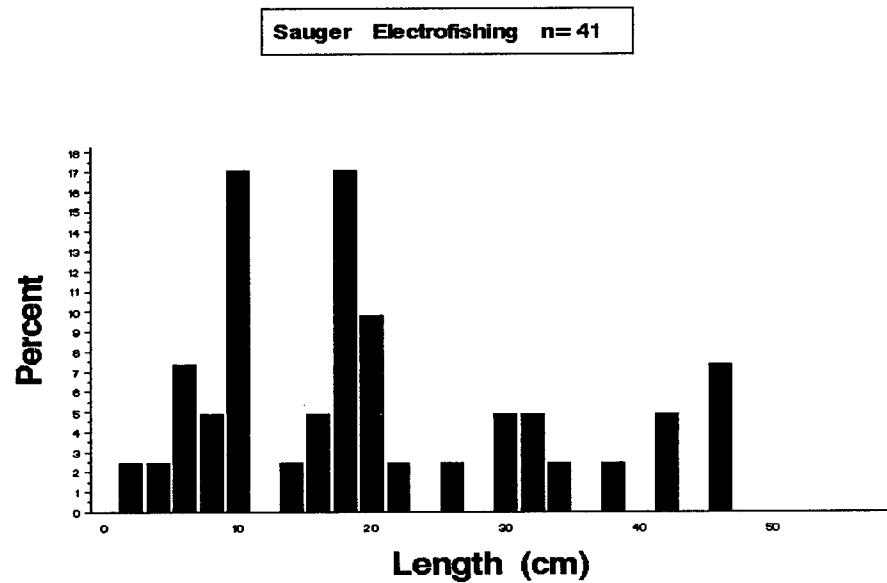


Figure 4.13. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

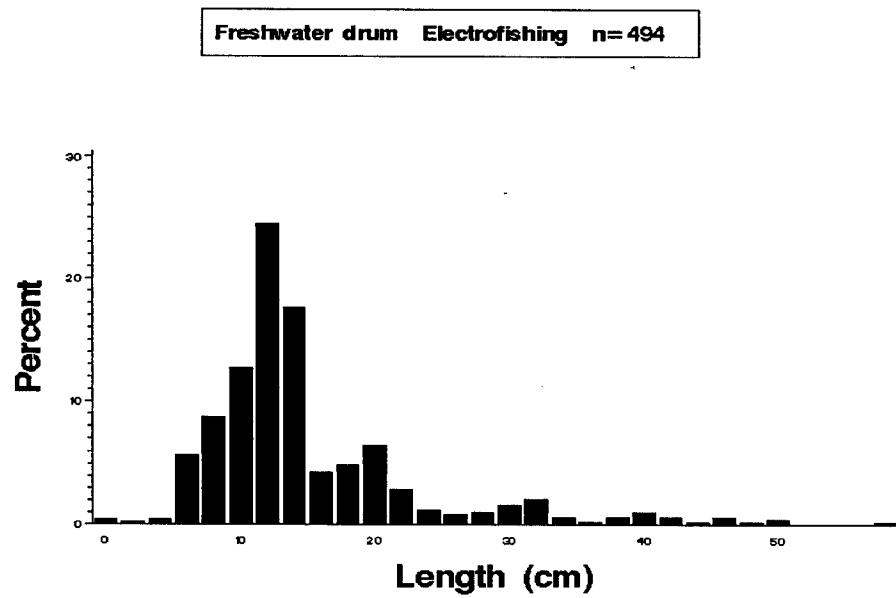


Figure 4.14. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplochiton grunniens*) collected by electrofishing in Upper Mississippi River Pool 26 during 1998.

Chapter 5. Mississippi River Open Reach

by

Michael D. Petersen and David P. Herzog

Missouri Department of Conservation
LTRMP Open River Field Station
3815 E. Jackson Boulevard
Jackson, Missouri 63755

Hydrograph

Mississippi River Open Reach water stages are influenced by discharges from the Upper Mississippi, Missouri, Illinois, and—to a lesser extent—Ohio Rivers. Water stage may fluctuate in the open river by 3–5 feet/week and more than 20 feet/year. At stages above 22.0 feet, (Cape Girardeau Gage, 326 feet above mean sea level), successful gear sets are reduced by high water velocity and flooded riparian vegetation. At stages between 22.0 and 17.0 feet, wing dams become totally to partly submerged. Water velocity above submerged wing dams limits the use of most sampling gear. At stages below 17.0 feet, closing structures emerge making it difficult to access side channels. Gear must be carried in or private landowner permission must be granted to access isolated waters. The SCB is the most difficult stratum to sample, primarily because of access problems.

In 1998, water stages were higher than normal for most of the year. Fluctuations in water stage were typically 2–10 feet/week. The lowest stage occurred on September 15 at 31.3 feet, and the highest stage occurred on April 20 at 39.1 feet. Water stages during LTRMP sampling in 1998 could be characterized as high and unstable (Figure 5.1). Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

Summary of Sampling Effort

In 1998, 435 random and fixed-site samples were planned consisting of 145 samples in each of three periods. A total of 354 random samples were allocated in three strata: MCBU (composing 32% of the total planned random sampling effort), MCBW (17%), and SCB (51%). A total of 81 samples were allocated in three fixed sites—two TRI (44%) and one MCBU stratum (56%).

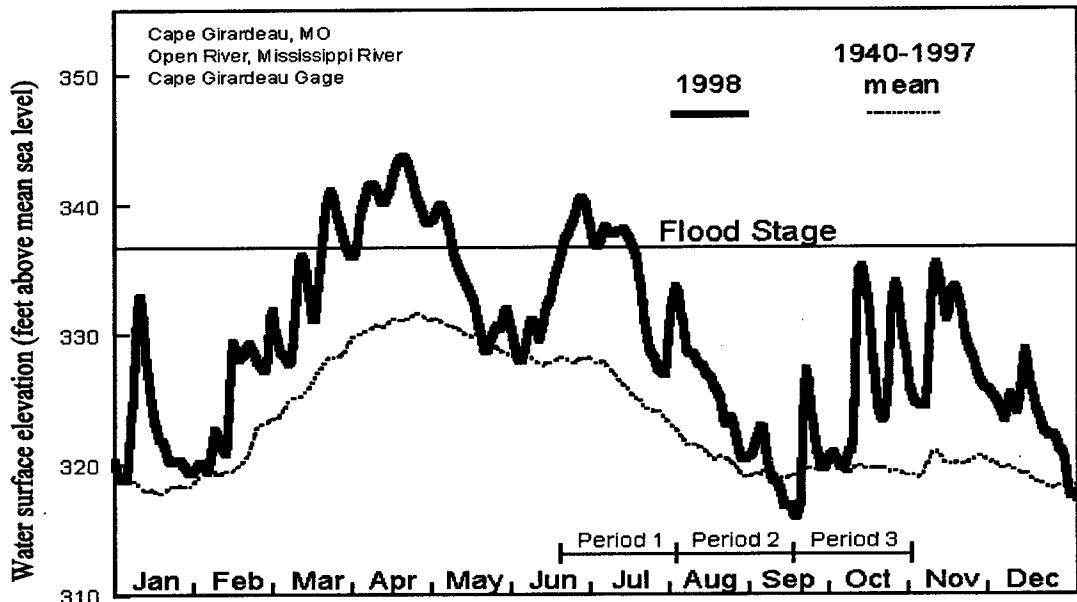


Figure 5.1. Daily water surface elevation from Cape Girardeau Gage, for the Upper Mississippi River Open Reach, during 1998 and mean elevation since 1940. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

A total of 254 samples were completed in 1998 consisting of 63, 106, and 85 samples in periods 1, 2, and 3, respectively (Table 5.1). A total of 208 random samples, 28 TRI fixed-site samples, 18 MCBU fixed-site samples, and 4 (MCBU, SCB) fixed-site trawling samples were completed. The low numbers of completed samples were the result of fluctuating water stages.

Total Catch by Gear

Historically, 129 fish species have been collected from the open river (Pitlo et al. 1995). Open River field station biologists have collected 98 species from 1991 to 1998. In 1998, 63 species representing 14,990 fish were collected (Table 5.2). This total does not include 14 fish <30 mm long identified only to genus or unidentified. The five most numerically abundant species collected were gizzard shad (5,557), freshwater drum (3,068), emerald shiner (1,205), channel catfish (640), and common carp (619).

The following summarizes total fish catch and number of species by gear: day electrofishing, 5,879 fish and 51 species; fyke netting, 391 fish and 19 species; mini fyke netting, 6,652 fish and 49 species; seining, 143 fish and 10 species; small hoop netting, 472 fish and 15 species; large hoop netting, 1,187 fish and 15 species; gill netting, 211 fish and 20 species; and trawling, 69 fish and 12 species.

In 1998, inland silversides were collected for the first time, although they had been collected earlier by other researchers. Five Missouri-listed species were collected: paddlefish, mooneye, Mississippi silvery minnow, sicklefin chub, and blue sucker. The sicklefin chub is a candidate for Federal listing.

Random Sampling, Mean C/f by Gear and Stratum

Day Electrofishing

Gizzard shad (81.62 fish/15 min), emerald shiner (15.17), and red shiner (4.98) had the highest day electrofishing C/f when combining all strata (Table 5.3.1). The highest C/f by stratum were

MCBU: gizzard shad (80.56), emerald shiner (15.00), and channel catfish (5.11); MCBW: gizzard shad (45.17), emerald shiner (7.67), common carp (3.67); and SCB: gizzard shad (92.44), red shiner (32.13), and emerald shiner (17.06).

Fyke Net

Shortnose gar (19.17 fish/net-day), freshwater drum (1.66), and white bass (1.54) had the highest fyke netting C/f in the SCB stratum (Table 5.3.2).

Mini Fyke Net

Freshwater drum (83.26 fish/net-day), gizzard shad (10.88), and emerald shiner (6.10) had the highest mini fyke netting C/f when combining all strata (Table 5.3.3). The highest C/f by stratum were MCBU: freshwater drum (94.15), gizzard shad (8.77), and emerald shiner (5.31); MCBW: gizzard shad (85.69), emerald shiner (22.39), and bluegill (8.35); and SCB: gizzard shad (20.30), emerald shiner (10.65), and freshwater drum (9.48).

Small Hoop Net

Channel catfish (2.81 fish/net-day), common carp (0.81), and smallmouth buffalo (0.19) had the highest small hoop netting C/f when combining all strata (Table 5.3.4). The highest C/f by stratum were MCBU: channel catfish (2.82), common carp (0.73), and smallmouth buffalo (0.21); MCBW: common carp (0.87) and channel catfish (0.77); and SCB: channel catfish (2.93), common carp (1.46), and flathead catfish (0.21).

Large Hoop Net

Smallmouth buffalo (2.95 fish/net-day), freshwater drum (1.94), and common carp (1.85) had the highest large hoop netting C/f when combining all strata (Table 5.3.5). The highest C/f by stratum were MCBU: smallmouth buffalo (3.14), freshwater drum (2.02), and common carp (1.62); MCBW: smallmouth buffalo (1.41), black buffalo (0.57), and common carp (0.40); and SCB: common carp (3.66), smallmouth buffalo (1.68), and freshwater drum (1.53).

Seine

Gizzard shad (16.75 fish/haul), emerald shiner (1.50), and channel shiner (0.50) had the highest seining *C/f* in the MCBU stratum (Table 5.3.6).

Gill Net

Freshwater drum (3.81 fish/net-day), common carp (1.97), and blue catfish (1.85) had the highest gill netting *C/f* when combining all strata (Table 5.3.7). The highest *C/f* by stratum were MCBW: gizzard shad (2.97) and freshwater drum (1.98); and SCB: freshwater drum (3.96), common carp (2.05), and blue catfish (1.92).

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

Gizzard shad (81.00 fish/15 min), channel catfish (2.00), and emerald shiner (2.00) had the highest day electrofishing *C/f* in the MCBU stratum (Table 5.4.1). Gizzard shad (198.50), orangespotted sunfish (18.50), and bluegill (15.50) had the highest *C/f* in the TRI stratum.

Fyke Net

Freshwater drum (7.73 fish/net-day), common carp (2.69), and channel catfish (1.03) had the highest fyke netting *C/f* in the MCBU stratum (Table 5.4.2). Freshwater drum (6.02), shortnose gar (5.18), and white crappie (3.22) had the highest *C/f* in the TRI stratum.

Mini Fyke Net

Freshwater drum (390.26 fish/net-day), gizzard shad (40.23), and emerald shiner (7.39) had the highest mini fyke netting *C/f* in the MCBU stratum (Table 5.4.3). Bluegill (5.20), gizzard shad (3.28), and white crappie (2.54) had the highest *C/f* in the TRI stratum.

Small Hoop Net

Channel catfish (4.21 fish/net-day), common carp (0.76), and smallmouth buffalo (0.49) had the highest small hoop netting *C/f* in the MCBU stratum (Table 5.4.4). Common carp (3.63), channel catfish (1.66), and bluegill (0.94) had the highest *C/f* in the TRI stratum.

Large Hoop Net

Smallmouth buffalo (9.27 fish/net-day), river carpsucker (2.30), and freshwater drum (0.85) had the highest large hoop netting *C/f* in the MCBU stratum (Table 5.4.5). River carpsucker (28.56), smallmouth buffalo (14.31), and black buffalo (5.03) had the highest *C/f* in the TRI stratum.

Seine

Channel catfish (8.00 fish/haul), freshwater drum (1.80), and gizzard shad (1.60) had the highest seining *C/f* in the MCBU stratum (Table 5.4.6).

Trawl

Freshwater drum (19.50 fish/haul) and channel catfish (5.00) had the highest trawling *C/f* in the MCBU stratum (Table 5.4.7). Freshwater drum and channel catfish (1.50) had the highest *C/f* in the SCB stratum.

Gill Net

Common carp (8.54 fish/net-day), gizzard shad (3.47), and freshwater drum (1.11) had the highest gill netting *C/f* in the TRI stratum (Table 5.4.8).

Length Distributions of Selected Species

Length-frequency histograms are presented for selected species in Figures 5.2 to 5.17. Meaningful biological interpretation of the histograms is limited

because of small sample size or size selectivity of the gear (Anderson and Neumann 1996). Despite these biases, some river managers may find the histograms useful, therefore are in this report. No age-growth data are available at this time for the Mississippi River Open Reach study.

Gizzard Shad

A total of 3,431 gizzard shad were collected by day electrofishing (Figure 5.2). The length-frequency distribution comprised 6–10-cm-long fish and had a mode of 8 cm.

Common Carp

Ninety-seven common carp were collected by day electrofishing (Figure 5.3). Most common carp were 38–56 cm long.

Smallmouth Buffalo

Twenty-nine smallmouth buffalo were collected by day electrofishing (Figure 5.4). The length-frequency distribution comprised 26–40-cm-long fish, with a mode of 28 cm. Three hundred forty-six smallmouth buffalo were collected with small and large hoop nets (Figure 5.5). The length-frequency distribution comprised 22–76-cm-long fish. Most smallmouth buffalo were 32–48 cm long and had a mode of 36 cm.

Channel Catfish

One hundred eight channel catfish were collected by day electrofishing (Figure 5.6). The length-frequency distribution comprised 4–64-cm-

long fish. The greatest percentage of channel catfish were 4–6 cm long. Three hundred thirty-five channel catfish were collected with small and large hoop nets (Figure 5.7). The length-frequency distribution comprised 10–68-cm-long fish. The greatest percentage of channel catfish were 14–20 cm long.

White Bass

One hundred twelve white bass were collected by day electrofishing (Figure 5.8). The length-frequency distribution comprised 6–40-cm-long fish and had a mode of 80 mm.

Bluegill

One hundred forty bluegills were collected by day electrofishing (Figure 5.9). The length-frequency distribution comprised 1–18-cm-long fish and had a mode of 20 mm.

Largemouth Bass

Twelve largemouth bass were collected by day electrofishing (Figure 5.11). The length-frequency distribution comprised 10–40-cm-long fish.

Freshwater Drum

One hundred fifty freshwater drum were collected by day electrofishing (Figure 5.12). The length-frequency distribution comprised 4–36-cm-long fish and a mode at 10 cm. Seventy-four freshwater drum were collected with fyke nets (Figure 5.17). The length-frequency distribution comprised 8–44-cm-long fish, with modes at 16 and 30 cm.

Table 5.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in the Mississippi River Open Reach during 1998. Table entries are numbers of successfully completed standardized monitoring collections.

Table page: 1

Sampling period=1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Fyke net			2	1				2		5
Gill net			3					1		4
Large hoop net			8	5	2					15
Small hoop net			8	5	3					16
Mini fyke net			8	5	4			2		19
Trawling			2	2						4
SUBTOTAL	0	0	31	18	9	0	0	5	0	63

Sampling period=2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing			7	6	2			2		17
Fyke net			4	1				2		7
Gill net			5					2		7
Large hoop net			10	5	4			2		21
Small hoop net			10	5	4			2		21
Mini fyke net			12	5	5			2		24
Seine				9						9
SUBTOTAL	0	0	48	31	15	0	0	12	0	106

Sampling period=3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing			9	5	4			2		20
Fyke net			3	1				2		6
Gill net					1			1		2
Large hoop net			8	5	3			2		18
Small hoop net			8	5	3			2		18
Mini fyke net			9	5	5			2		21
SUBTOTAL	0	0	37	21	16	0	0	11	0	85
	====	====	====	====	====	====	====	====	====	=====
	0	0	116	70	40	0	0	28	0	254

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in the Mississippi River Open Reach. See Table 5.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	5	-	-	-	-	-	1	-	1	-	-	-	6
2	Shovelnose sturgeon	<i>Sagipirhynchus platyrhynchus</i>	-	-	-	-	-	-	-	-	11	-	1	1	13
3	Unidentified sturgeon	<i>Sagipirhynchus</i> sp.	-	-	-	-	-	-	-	-	-	-	-	1	1
4	Paddlefish	<i>Polyodon spathula</i>	-	-	-	-	-	-	-	-	4	-	2	-	6
5	Spotted gar	<i>Lepisosteus osseus</i>	3	-	-	-	-	-	-	-	-	-	-	-	3
6	Longnose gar	<i>Lepisosteus osseus</i>	10	-	3	-	-	-	6	-	-	1	2	-	22
7	Shortnose gar	<i>Lepisosteus platostomus</i>	95	-	174	-	25	-	1	3	-	2	3	-	309
8	Bowfin	<i>Anisus calva</i>	1	-	-	-	-	-	-	-	-	3	-	-	4
9	Goldeye	<i>Hiodon alosoides</i>	59	-	-	-	-	-	8	-	-	1	-	-	68
10	Mooneye	<i>Hiodon tergisus</i>	-	-	-	-	-	-	-	-	-	-	-	-	2
11	American eel	<i>Anguilla rostrata</i>	1	-	3	-	-	1	-	-	-	-	-	-	6
12	Skipjack herring	<i>Alosa chrysoschloris</i>	3431	-	6	-	2025	-	2	-	-	-	-	-	5557
13	Gizzard shad	<i>Dorosoma cepedianum</i>	68	-	1	-	73	-	2	-	75	-	20	-	142
14	Threadfin shad	<i>Campostoma anomalum</i>	-	-	-	-	-	-	1	-	-	-	-	-	1
15	Central stoneroller	<i>Ctenopharyngodon idellus</i>	-	-	-	-	-	-	1	-	-	-	-	-	9
16	Grass carp	<i>Cyprinella lutrensis</i>	536	-	-	-	76	-	-	-	-	3	5	-	612
17	Red shiner	<i>Cyprinella spiloptera</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
18	Spotfin shiner	<i>Cyprinella venusta</i>	21	-	-	-	-	-	-	-	-	-	-	-	21
19	Blacktail shiner	<i>Cyprinus carpio</i>	97	-	22	-	52	-	2	-	-	-	-	-	619
20	Common carp	<i>Hybognathus nuchalis</i>	-	-	-	-	-	-	6	-	-	47	-	-	619
21	Mississippi silvery minnow	<i>Hypophthalmichthys nobilis</i>	2	-	-	-	-	-	-	-	-	1	-	-	8
22	Bighead carp	<i>Luxilus chrysocelphalus</i>	-	-	-	-	-	-	31	-	-	1	-	-	33
23	Striped shiner	<i>Macrhybopsis aestivalis</i>	3	-	-	-	-	-	1	-	-	1	-	-	3
24	Speckled chub	<i>Macrhybopsis meeki</i>	-	-	-	-	-	-	17	-	-	1	-	-	23
25	Sicklefin chub	<i>Macrhybopsis storriana</i>	3	-	-	-	-	-	1	-	-	1	-	-	2
26	Silver chub	<i>Notropis atherinoides</i>	490	-	-	-	706	-	6	-	-	14	-	-	18
27	Emerald shiner	<i>Notropis bleekeri</i>	-	-	-	-	-	-	12	-	-	1	-	-	1
28	River shiner	<i>Notropis shumardi</i>	17	-	-	-	17	-	1	-	-	1	-	-	36
29	Silverband shiner	<i>Notropis stramineus</i>	96	-	-	-	343	-	5	-	-	1	-	-	445
30	Sand shiner	<i>Notropis wickliffei</i>	-	-	-	-	-	-	14	-	1	-	-	-	3
31	Channel shiner	<i>Pimephales notatus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
32	Bluntnose minnow	<i>Pimephales promelas</i>	-	-	-	-	-	-	2	-	-	-	-	-	1
33	Fathead minnow	<i>Pimephales vigilax</i>	7	-	-	-	-	-	1	-	-	-	-	-	16
34	Bullhead minnow	<i>Carpio carpio</i>	15	-	18	-	10	-	1	-	246	14	-	304	
35	River carp sucker	<i>Cyclolepis elongatus</i>	-	-	-	-	-	-	1	-	-	1	-	-	1
36	Blue sucker	<i>Ictalurus punctatus</i>	29	-	1	-	1	-	10	-	336	5	-	383	
37	Smallmouth buffalo	<i>Ictalurus cyprinellus</i>	6	-	1	-	1	-	11	-	11	5	-	23	
38	Bigmouth buffalo	<i>Ictalurus niger</i>	6	-	6	-	6	-	8	-	80	-	-	-	105
39	Black buffalo														

Gears: D - Day electrofishing
 N - Night electrofishing
 S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 F - Fyke netting
 X - Tandem fyke netting
 G - Gill netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 5.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in the Mississippi River Open Reach. See Table 5.1 for the list of sampling gears actually deployed in this study reach.

Gears:	D	Day electrofishing	S	Seining
	N	Night electrofishing	HS	Small hoop netting
	F	Fyke netting	HL	Large hoop netting
	X	Tandem fyke netting	G	Gill netting
	M	Mini fyke netting	TA	Trammel netting, anchored sets
	Y	Tandem mini fyke netting	T	Trawling (4.8-m bottom trawl)

Table 5.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	MCBW	SCB
Chestnut lamprey	0.39 (0.26)	0.44 (0.29)	0.17 (0.17)	0.00 (0.00)
Spotted gar	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Longnose gar	0.25 (0.13)	0.22 (0.15)	0.00 (0.00)	0.50 (0.24)
Shortnose gar	2.06 (0.68)	1.78 (0.76)	0.33 (0.21)	4.31 (1.17)
Bowfin	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Goldeye	1.82 (0.42)	1.78 (0.46)	0.83 (0.83)	2.25 (1.03)
American eel	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Skipjack herring	0.30 (0.21)	0.33 (0.24)	0.17 (0.17)	0.06 (0.06)
Gizzard shad	81.62 (16.88)	80.56 (18.99)	45.17 (13.48)	92.44 (28.07)
Threadfin shad	2.47 (2.42)	2.78 (2.78)	0.67 (0.33)	0.31 (0.18)
Red shiner	4.98 (1.78)	1.33 (0.60)	0.83 (0.48)	32.13 (14.43)
Spotfin shiner	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Blacktail shiner	0.14 (0.10)	0.11 (0.11)	0.50 (0.50)	0.31 (0.20)
Common carp	2.19 (0.54)	2.11 (0.61)	3.67 (1.26)	2.69 (0.74)
Mississippi silvery minnow	0.10 (0.10)	0.11 (0.11)	0.00 (0.00)	0.06 (0.06)
Speckled chub	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.19 (0.14)
Silver chub	0.02 (0.01)	0.00 (0.00)	0.00 (0.00)	0.19 (0.10)
Emerald shiner	15.17 (2.98)	15.00 (3.23)	7.67 (3.70)	17.06 (8.34)
River shiner	0.05 (0.02)	0.00 (0.00)	0.17 (0.17)	0.44 (0.20)
Silverband shiner	0.11 (0.08)	0.00 (0.00)	0.00 (0.00)	0.94 (0.69)
Sand shiner	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Channel shiner	1.85 (0.69)	1.44 (0.67)	0.00 (0.00)	5.00 (3.05)
Bluntnose minnow	0.10 (0.10)	0.11 (0.11)	0.00 (0.00)	0.00 (0.00)
Bullhead minnow	0.22 (0.13)	0.22 (0.15)	0.00 (0.00)	0.19 (0.14)
River carpsucker	0.26 (0.20)	0.22 (0.22)	0.17 (0.17)	0.56 (0.26)
Smallmouth buffalo	0.37 (0.15)	0.22 (0.15)	0.17 (0.17)	1.50 (0.63)
Bigmouth buffalo	0.04 (0.02)	0.00 (0.00)	0.00 (0.00)	0.38 (0.20)
Black buffalo	0.12 (0.10)	0.11 (0.11)	0.17 (0.17)	0.19 (0.10)
Golden redhorse	0.10 (0.10)	0.11 (0.11)	0.00 (0.00)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 5.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	MCBU	MCBW	SCB
Channel catfish	4.79 (1.73)	5.11 (1.98)	1.33 (0.56)	2.75 (0.70)
Freckled madtom	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)
Flathead catfish	0.90 (0.40)	0.89 (0.45)	1.00 (0.45)	0.94 (0.28)
Blackstripe topminnow	0.06 (0.04)	0.00 (0.00)	0.00 (0.00)	0.50 (0.38)
Western mosquitofish	0.39 (0.31)	0.00 (0.00)	0.00 (0.00)	3.25 (2.64)
Brook silverside	0.57 (0.34)	0.44 (0.34)	0.00 (0.00)	1.56 (1.43)
White bass	2.82 (0.86)	2.78 (0.97)	1.00 (0.52)	3.31 (1.16)
Green sunfish	0.12 (0.08)	0.00 (0.00)	0.00 (0.00)	1.00 (0.70)
Warmouth	0.03 (0.02)	0.00 (0.00)	0.00 (0.00)	0.25 (0.17)
Orangespotted sunfish	0.23 (0.16)	0.00 (0.00)	0.00 (0.00)	1.94 (1.38)
Bluegill	0.58 (0.44)	0.00 (0.00)	0.00 (0.00)	4.88 (3.74)
Longear sunfish	0.08 (0.04)	0.00 (0.00)	0.00 (0.00)	0.69 (0.34)
Spotted bass	0.01 (0.01)	0.00 (0.00)	0.17 (0.17)	0.06 (0.06)
Largemouth bass	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Black crappie	0.02 (0.02)	0.00 (0.00)	0.00 (0.00)	0.19 (0.19)
Mud darter	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.13 (0.09)
Logperch	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Sauger	0.40 (0.29)	0.44 (0.34)	0.17 (0.17)	0.13 (0.09)
Walleye	0.39 (0.29)	0.44 (0.34)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	2.25 (0.75)	1.44 (0.58)	0.33 (0.21)	8.31 (4.66)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	SCB
Longnose gar	0.15 (0.15)	0.15 (0.15)
Shortnose gar	19.17 (11.54)	19.17 (11.57)
Gizzard shad	0.38 (0.26)	0.38 (0.26)
Common carp	0.64 (0.19)	0.64 (0.19)
River carpsucker	0.38 (0.18)	0.38 (0.18)
Black buffalo	0.25 (0.16)	0.25 (0.16)
Channel catfish	0.37 (0.18)	0.37 (0.18)
Flathead catfish	0.37 (0.26)	0.37 (0.26)
White bass	1.54 (0.68)	1.54 (0.69)
Bluegill	0.15 (0.15)	0.15 (0.15)
Black crappie	0.15 (0.15)	0.15 (0.15)
Freshwater drum	1.66 (0.88)	1.66 (0.88)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 5.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	MCBW	SCB
Longnose gar	0.01 (0.00)	0.00 (0.00)	0.34 (0.21)	0.03 (0.03)
Shortnose gar	0.19 (0.10)	0.16 (0.11)	0.29 (0.23)	0.38 (0.18)
Goldeye	0.17 (0.15)	0.17 (0.17)	0.00 (0.00)	0.14 (0.11)
American eel	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Skipjack herring	0.07 (0.07)	0.08 (0.08)	0.07 (0.07)	0.00 (0.00)
Gizzard shad	10.88 (3.33)	8.77 (3.32)	85.69 (42.46)	20.30 (13.68)
Threadfin shad	0.63 (0.37)	0.63 (0.43)	2.96 (1.46)	0.41 (0.16)
Central stoneroller	0.07 (0.07)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Grass carp	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Red shiner	0.27 (0.11)	0.00 (0.00)	1.18 (0.40)	2.18 (0.95)
Common carp	0.56 (0.23)	0.58 (0.26)	2.41 (1.33)	0.22 (0.11)
Mississippi silvery minnow	0.01 (0.00)	0.00 (0.00)	0.34 (0.22)	0.04 (0.04)
Bighead carp	1.14 (0.98)	1.29 (1.12)	0.89 (0.50)	0.08 (0.05)
Striped shiner	0.00 (0.00)	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)
Speckled chub	0.48 (0.37)	0.50 (0.42)	0.07 (0.07)	0.35 (0.16)
Silver chub	0.24 (0.15)	0.24 (0.17)	0.28 (0.22)	0.19 (0.09)
Emerald shiner	6.10 (3.61)	5.31 (4.03)	22.39 (13.28)	10.65 (6.89)
River shiner	0.12 (0.08)	0.09 (0.09)	0.00 (0.00)	0.37 (0.26)
Silverband shiner	0.27 (0.15)	0.24 (0.17)	0.07 (0.07)	0.44 (0.21)
Channel shiner	3.71 (1.76)	2.96 (1.88)	3.31 (0.83)	9.32 (5.52)
Bluntnose minnow	0.00 (0.00)	0.00 (0.00)	0.14 (0.14)	0.00 (0.00)
Fathead minnow	0.00 (0.00)	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)
Bullhead minnow	0.02 (0.02)	0.00 (0.00)	0.30 (0.24)	0.18 (0.13)
River carpsucker	0.17 (0.14)	0.16 (0.16)	0.00 (0.00)	0.31 (0.18)
Smallmouth buffalo	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Blue catfish	0.00 (0.00)	0.00 (0.00)	0.14 (0.09)	0.00 (0.00)
Channel catfish	2.08 (0.63)	2.09 (0.72)	2.33 (0.86)	2.00 (0.59)
Freckled madtom	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.07 (0.05)
Flathead catfish	0.02 (0.01)	0.00 (0.00)	0.15 (0.10)	0.12 (0.07)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 5.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	MCBU	MCBW	SCB
Pirate perch	0.07 (0.07)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Blackstripe topminnow	0.01 (0.01)	0.00 (0.00)	0.07 (0.07)	0.07 (0.07)
Western mosquitofish	0.12 (0.06)	0.00 (0.00)	0.48 (0.29)	0.94 (0.53)
Brook silverside	0.00 (0.00)	0.00 (0.00)	0.41 (0.34)	0.00 (0.00)
White bass	1.58 (0.59)	1.76 (0.68)	1.76 (0.66)	0.23 (0.10)
Green sunfish	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.11 (0.08)
Warmouth	0.08 (0.07)	0.08 (0.08)	0.00 (0.00)	0.07 (0.07)
Orangespotted sunfish	0.43 (0.15)	0.23 (0.12)	1.87 (1.29)	1.80 (0.84)
Bluegill	1.24 (0.55)	1.06 (0.63)	8.35 (5.41)	1.97 (0.51)
Longear sunfish	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.07 (0.07)
Spotted bass	0.00 (0.00)	0.00 (0.00)	0.07 (0.07)	0.00 (0.00)
Largemouth bass	0.08 (0.07)	0.08 (0.08)	0.00 (0.00)	0.04 (0.04)
White crappie	0.52 (0.22)	0.57 (0.25)	1.11 (1.11)	0.08 (0.06)
Black crappie	0.01 (0.00)	0.00 (0.00)	0.07 (0.07)	0.04 (0.04)
Mud darter	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.11 (0.06)
Sauger	0.08 (0.08)	0.09 (0.09)	0.00 (0.00)	0.00 (0.00)
Freshwater drum	83.26 (38.33)	94.15 (43.98)	6.43 (1.69)	9.48 (5.01)
Larval fish	0.36 (0.36)	0.42 (0.42)	0.00 (0.00)	0.00 (0.00)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 5.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	MCBW	SCB
Chestnut lamprey	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Shortnose gar	0.04 (0.04)	0.04 (0.04)	0.05 (0.05)	0.00 (0.00)
American eel	0.04 (0.04)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Common carp	0.81 (0.35)	0.73 (0.40)	0.87 (0.41)	1.46 (0.30)
Smallmouth buffalo	0.19 (0.15)	0.21 (0.17)	0.05 (0.05)	0.02 (0.02)
Black buffalo	0.01 (0.01)	0.00 (0.00)	0.10 (0.10)	0.08 (0.06)
Blue catfish	0.04 (0.04)	0.04 (0.04)	0.10 (0.10)	0.02 (0.02)
Channel catfish	2.81 (0.84)	2.82 (0.95)	0.77 (0.45)	2.93 (0.82)
Flathead catfish	0.17 (0.06)	0.17 (0.07)	0.00 (0.00)	0.21 (0.07)
White bass	0.00 (0.00)	0.00 (0.00)	0.05 (0.05)	0.00 (0.00)
Freshwater drum	0.10 (0.05)	0.08 (0.06)	0.05 (0.05)	0.21 (0.06)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWC0 - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	MCBW	SCB
Shovelnose sturgeon	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Longnose gar	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Shortnose gar	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
Grass carp	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Common carp	1.85 (0.57)	1.62 (0.64)	0.40 (0.28)	3.66 (0.82)
Bighead carp	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.02)
River carpsucker	1.24 (1.04)	1.34 (1.19)	0.00 (0.00)	0.56 (0.47)
Smallmouth buffalo	2.95 (0.92)	3.14 (1.06)	1.41 (0.81)	1.68 (0.37)
Bigmouth buffalo	0.13 (0.09)	0.14 (0.10)	0.00 (0.00)	0.12 (0.05)
Black buffalo	0.20 (0.07)	0.14 (0.07)	0.57 (0.29)	0.66 (0.19)
Blue catfish	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.03)
Channel catfish	1.33 (0.79)	1.43 (0.90)	0.11 (0.07)	0.66 (0.22)
Flathead catfish	0.20 (0.07)	0.19 (0.08)	0.11 (0.08)	0.29 (0.09)
White bass	0.20 (0.16)	0.23 (0.19)	0.00 (0.00)	0.02 (0.02)
Freshwater drum	1.94 (1.15)	2.02 (1.32)	0.28 (0.15)	1.53 (0.50)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MC BU - Main channel border, unstructured

Table 5.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU
Gizzard shad	16.75 (6.86)	16.75 (6.86)
Emerald shiner	1.50 (0.87)	1.50 (0.87)
Channel shiner	0.50 (0.50)	0.50 (0.50)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in the Mississippi River Open Reach using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 5.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBW	SCB
Shovelnose sturgeon	1.33 (0.95)	0.00 (0.00)	1.43 (1.03)
Paddlefish	0.23 (0.23)	0.00 (0.00)	0.25 (0.25)
Longnose gar	0.25 (0.25)	0.00 (0.00)	0.27 (0.27)
Shortnose gar	0.86 (0.39)	0.00 (0.00)	0.93 (0.42)
Bowfin	0.12 (0.12)	0.00 (0.00)	0.13 (0.13)
Goldeye	0.12 (0.12)	0.00 (0.00)	0.13 (0.13)
Gizzard shad	1.19 (0.41)	2.97 ()	1.04 (0.44)
Grass carp	0.12 (0.12)	0.00 (0.00)	0.13 (0.13)
Common carp	1.97 (0.59)	0.99 ()	2.05 (0.64)
Bighead carp	0.12 (0.12)	0.00 (0.00)	0.13 (0.13)
River carpsucker	1.23 (0.38)	0.99 ()	1.25 (0.42)
Blue sucker	0.12 (0.12)	0.00 (0.00)	0.13 (0.13)
Smallmouth buffalo	0.49 (0.26)	0.00 (0.00)	0.53 (0.28)
Bigmouth buffalo	0.23 (0.15)	0.00 (0.00)	0.25 (0.16)
Black buffalo	0.24 (0.16)	0.00 (0.00)	0.26 (0.17)
Blue catfish	1.85 (0.78)	0.99 ()	1.92 (0.85)
Channel catfish	0.72 (0.24)	0.00 (0.00)	0.78 (0.26)
Flathead catfish	0.11 (0.11)	0.00 (0.00)	0.12 (0.12)
White bass	0.84 (0.56)	0.00 (0.00)	0.91 (0.60)
Freshwater drum	3.81 (0.74)	1.98 ()	3.96 (0.80)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU	TRI
Spotted gar	0.00 (0.00)	0.50 (0.29)
Shortnose gar	1.50 (0.50)	1.25 (0.75)
Goldeye	1.00 (1.00)	0.00 (0.00)
Skipjack herring	0.00 (0.00)	0.50 (0.50)
Gizzard shad	81.00 (12.00)	198.50 (53.78)
Threadfin shad	0.00 (0.00)	8.50 (5.06)
Red shiner	0.00 (0.00)	1.25 (0.95)
Blacktail shiner	0.00 (0.00)	3.00 (3.00)
Common carp	0.00 (0.00)	3.25 (1.31)
Emerald shiner	2.00 (2.00)	8.00 (1.96)
River shiner	0.50 (0.50)	0.00 (0.00)
Silverband shiner	0.00 (0.00)	0.50 (0.29)
Channel shiner	0.00 (0.00)	0.75 (0.48)
Bullhead minnow	0.00 (0.00)	0.50 (0.29)
River carpsucker	0.00 (0.00)	0.75 (0.48)
Smallmouth buffalo	0.00 (0.00)	0.50 (0.50)
Black buffalo	0.00 (0.00)	0.25 (0.25)
Channel catfish	2.00 (1.00)	1.50 (1.19)
Flathead catfish	0.00 (0.00)	0.50 (0.29)
Blackstripe topminnow	0.00 (0.00)	3.50 (2.22)
Western mosquitofish	0.00 (0.00)	0.25 (0.25)
Brook silverside	0.00 (0.00)	4.50 (1.85)
Inland silverside	0.00 (0.00)	0.25 (0.25)
White bass	0.50 (0.50)	6.75 (3.84)
Warmouth	0.00 (0.00)	1.50 (0.50)
Orangespotted sunfish	0.00 (0.00)	18.50 (8.34)
Bluegill	0.00 (0.00)	15.50 (8.57)
Largemouth bass	0.00 (0.00)	2.75 (2.43)
White crappie	0.00 (0.00)	1.50 (0.96)
Black crappie	0.00 (0.00)	1.00 (0.41)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 5.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	MCBU	TRI
Mud darter	0.00 (0.00)	0.25 (0.25)
Sauger	0.50 (0.50)	0.50 (0.50)
Freshwater drum	0.00 (0.00)	2.00 (1.22)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU	TRI
Longnose gar	0.31 (0.31)	0.00 (0.00)
Shortnose gar	0.34 (0.34)	5.18 (1.67)
American eel	0.67 (0.67)	0.16 (0.16)
Gizzard shad	0.68 (0.34)	0.16 (0.16)
Threadfin shad	0.31 (0.31)	0.00 (0.00)
Common carp	2.69 (2.69)	1.22 (1.04)
River carpsucker	0.99 (0.58)	1.79 (1.44)
Black buffalo	0.00 (0.00)	0.33 (0.33)
Blue catfish	0.00 (0.00)	0.16 (0.16)
Channel catfish	1.03 (0.60)	0.00 (0.00)
Flathead catfish	0.31 (0.31)	0.17 (0.17)
White bass	0.65 (0.33)	3.07 (1.86)
Bluegill	0.31 (0.31)	0.50 (0.33)
White crappie	0.00 (0.00)	3.22 (3.01)
Black crappie	0.00 (0.00)	1.12 (1.12)
Sauger	0.31 (0.31)	0.00 (0.00)
Freshwater drum	7.73 (5.24)	6.02 (2.80)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU	TRI
Shortnose gar	0.32 (0.32)	1.39 (1.39)
Goldeye	0.69 (0.69)	0.00 (0.00)
Gizzard shad	40.23 (37.35)	3.28 (3.10)
Threadfin shad	1.98 (1.10)	1.11 (1.11)
Common carp	0.35 (0.35)	0.47 (0.47)
Bighead carp	0.00 (0.00)	0.17 (0.17)
Speckled chub	0.35 (0.35)	0.00 (0.00)
Sicklefin chub	0.35 (0.35)	0.00 (0.00)
Silver chub	0.67 (0.34)	0.00 (0.00)
Emerald shiner	7.39 (5.39)	1.15 (0.60)
River shiner	0.00 (0.00)	0.16 (0.16)
Silverband shiner	0.00 (0.00)	0.17 (0.17)
Channel shiner	2.72 (0.93)	0.47 (0.47)
Channel catfish	5.44 (1.86)	0.17 (0.17)
Brook silverside	0.35 (0.35)	0.00 (0.00)
White bass	1.30 (0.83)	0.47 (0.32)
Warmouth	0.00 (0.00)	0.87 (0.87)
Orangespotted sunfish	0.32 (0.32)	0.32 (0.32)
Bluegill	1.77 (1.77)	5.20 (4.19)
White crappie	0.00 (0.00)	2.54 (1.72)
Black crappie	0.00 (0.00)	0.17 (0.17)
Mud darter	0.00 (0.00)	0.35 (0.35)
Sauger	0.35 (0.35)	0.16 (0.16)
Freshwater drum	390.26 (383.52)	1.27 (0.90)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 5.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU	TRI
Shortnose gar	0.00 (0.00)	0.12 (0.12)
Common carp	0.76 (0.26)	3.63 (2.04)
River carpsucker	0.25 (0.25)	0.00 (0.00)
Smallmouth buffalo	0.49 (0.49)	0.12 (0.12)
Black buffalo	0.00 (0.00)	0.25 (0.15)
Channel catfish	4.21 (2.68)	1.66 (0.23)
Bluegill	0.00 (0.00)	0.94 (0.56)
White crappie	0.00 (0.00)	0.39 (0.39)
Black crappie	0.00 (0.00)	0.12 (0.12)
Freshwater drum	0.00 (0.00)	0.40 (0.26)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU	TRI
Shortnose gar	0.00 (0.00)	0.12 (0.12)
Grass carp	0.00 (0.00)	0.12 (0.12)
Common carp	0.17 (0.17)	3.62 (1.47)
River carpsucker	2.30 (2.06)	28.56 (13.07)
Smallmouth buffalo	9.27 (5.90)	14.31 (8.80)
Bigmouth buffalo	0.00 (0.00)	0.25 (0.14)
Black buffalo	0.33 (0.33)	5.02 (1.77)
Channel catfish	0.68 (0.68)	0.12 (0.12)
Flathead catfish	0.17 (0.17)	0.25 (0.25)
White bass	0.00 (0.00)	0.38 (0.38)
Freshwater drum	0.85 (0.85)	0.25 (0.25)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.6.. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU
Shortnose gar	0.20 (0.20)
Gizzard shad	1.60 (0.75)
Silver chub	0.20 (0.20)
Emerald shiner	0.60 (0.60)
Silverband shiner	0.20 (0.20)
Channel shiner	0.60 (0.60)
Channel catfish	8.00 (2.72)
Western mosquitofish	0.20 (0.20)
White bass	0.20 (0.20)
Freshwater drum	1.80 (0.73)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	MCBU	SCB
Shovelnose sturgeon	0.00 (0.00)	0.50 (0.50)
Unidentified sturgeon	0.50 (0.50)	0.00 (0.00)
Paddlefish	1.00 (1.00)	0.00 (0.00)
Mooneye	1.00 (1.00)	0.00 (0.00)
Speckled chub	1.00 (1.00)	0.50 (0.50)
Sicklefin chub	0.00 (0.00)	0.50 (0.50)
Silverband shiner	0.50 (0.50)	0.00 (0.00)
Channel shiner	0.50 (0.50)	0.00 (0.00)
Smallmouth buffalo	0.00 (0.00)	0.50 (0.50)
Channel catfish	5.00 (5.00)	1.50 (1.50)
Freshwater drum	19.50 (17.50)	1.50 (0.50)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 5.4.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using gill netting in the Mississippi River Open Reach using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TRI
Paddlefish	0.37 (0.37)
Shortnose gar	0.74 (0.74)
Bowfin	0.74 (0.74)
Gizzard shad	3.47 (2.43)
Common carp	8.54 (7.99)
River carpsucker	0.70 (0.35)
Smallmouth buffalo	0.33 (0.33)
Bigmouth buffalo	0.65 (0.65)
Black buffalo	1.02 (0.57)
Blue catfish	0.37 (0.37)
Channel catfish	1.05 (0.57)
Flathead catfish	0.37 (0.37)
White bass	0.37 (0.37)
Freshwater drum	1.11 (1.11)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

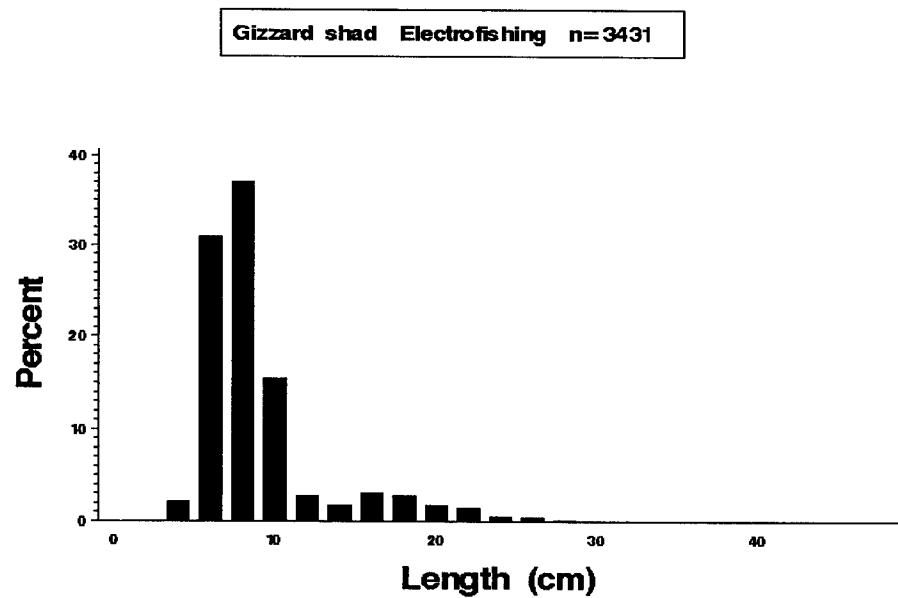


Figure 5.2. Length distributions (*length*) as a percentage of catch (*percent*) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

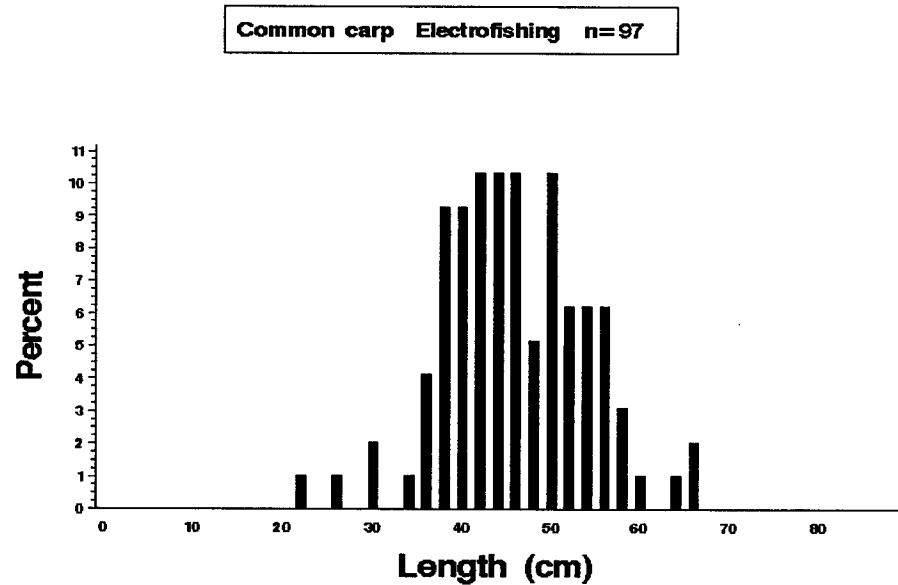


Figure 5.3. Length distributions (*length*) as a percentage of catch (*percent*) for common carp (*Cyprinus carpio*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

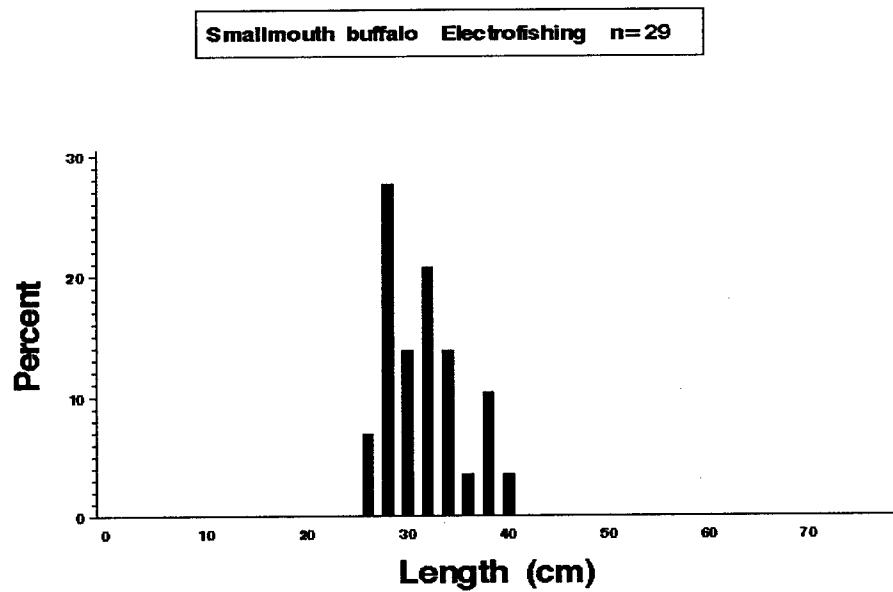


Figure 5.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

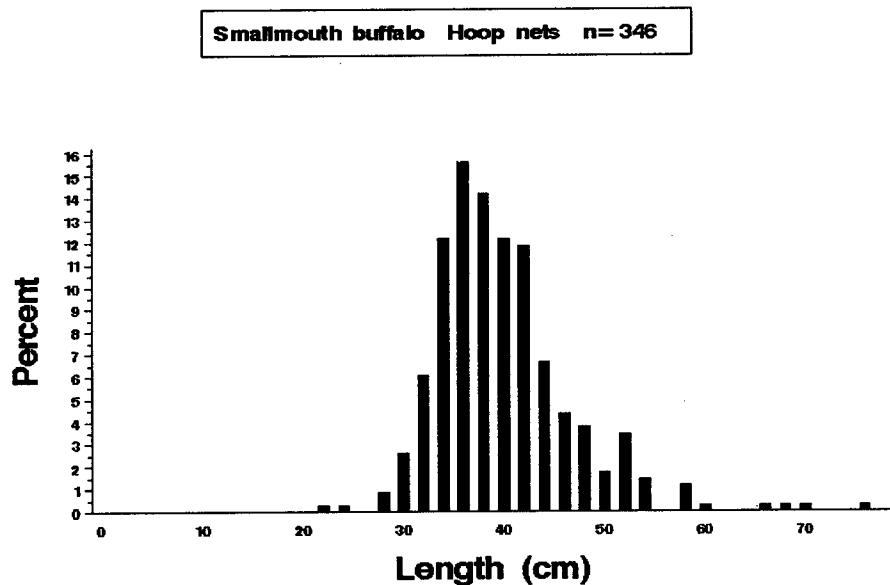


Figure 5.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by small and large hoop netting in the Upper Mississippi River Open Reach during 1998.

Channel catfish Electrofishing n=108

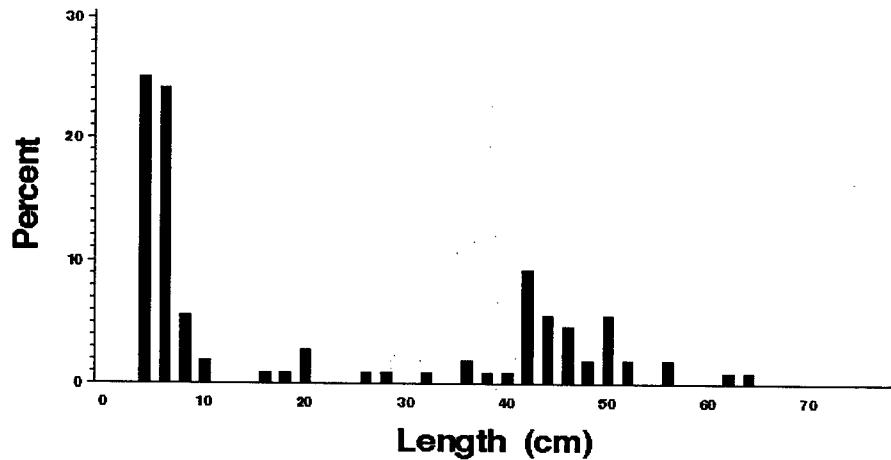


Figure 5.6. Length distributions (length) as a percentage of catch (percent) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

Channel catfish Hoop nets n=335

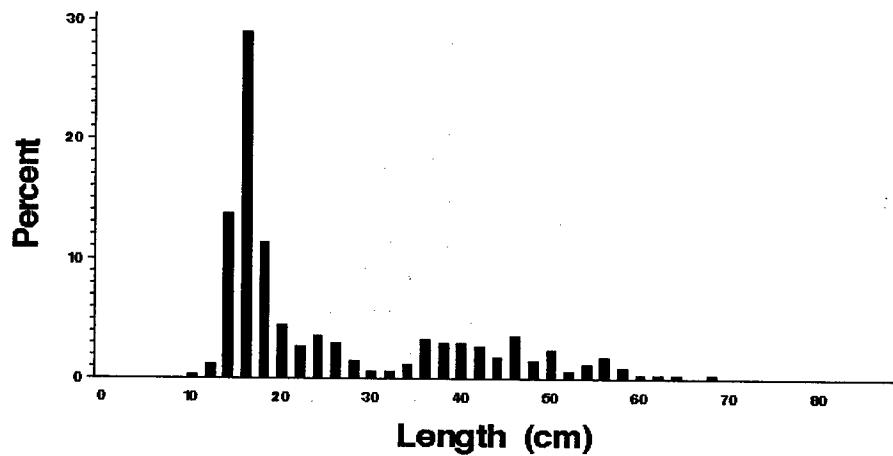


Figure 5.7. Length distributions (length) as a percentage of catch (percent) for channel catfish (*Ictalurus punctatus*) collected by small and large hoop netting in the Upper Mississippi River Open Reach during 1998.

White bass Electrofishing n=112

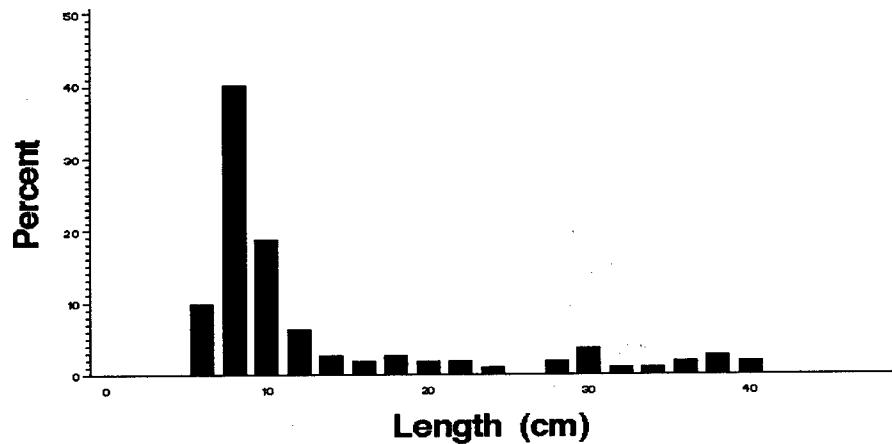


Figure 5.8. Length distributions (length) as a percentage of catch (percent) for white bass (*Morone chrysops*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

Bluegill Electrofishing n=140

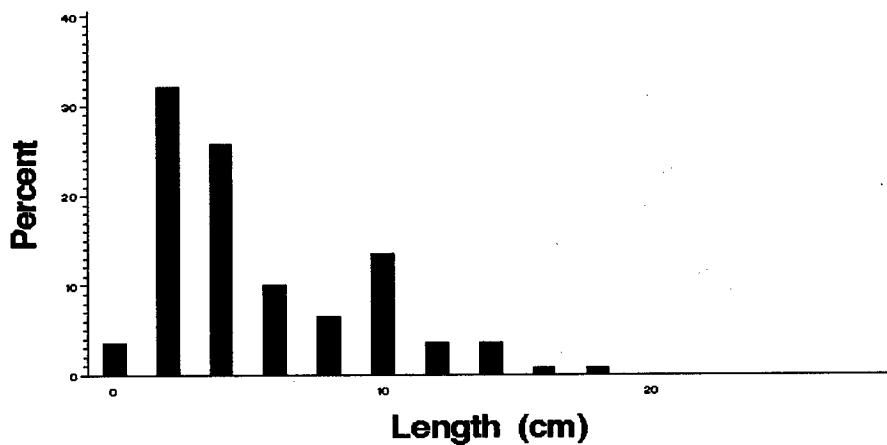


Figure 5.9. Length distributions (length) as a percentage of catch (percent) for bluegill (*Lepomis macrochirus*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

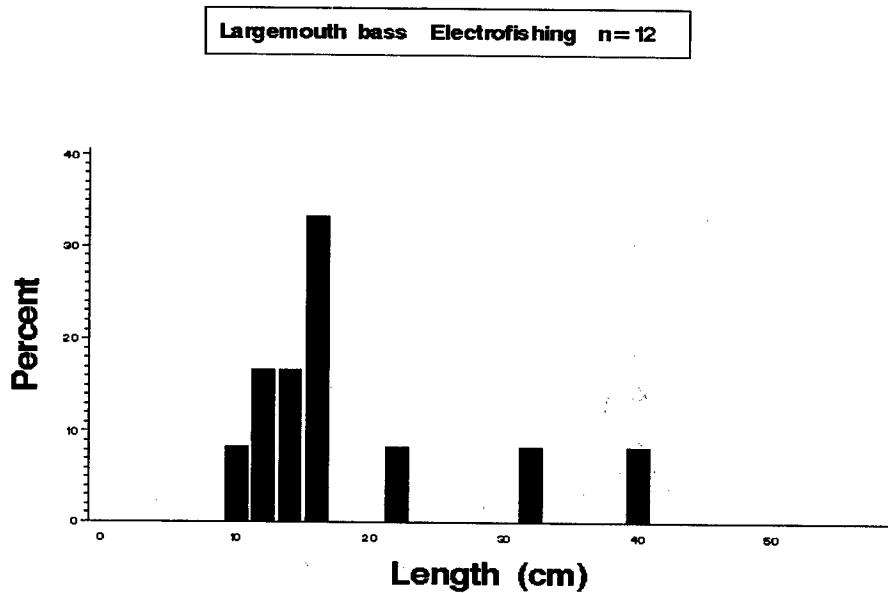


Figure 5.10. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

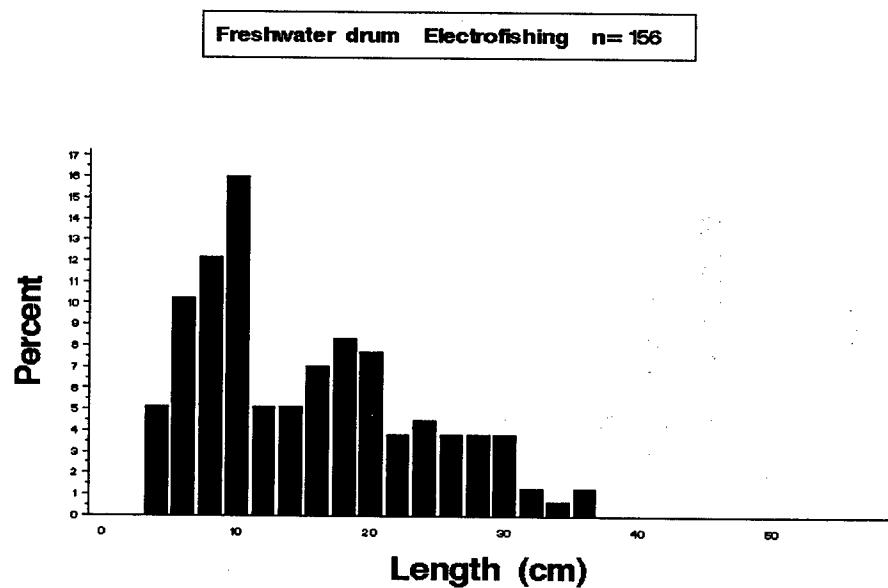


Figure 5.11. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplochiton grunniens*) collected by electrofishing in the Upper Mississippi River Open Reach during 1998.

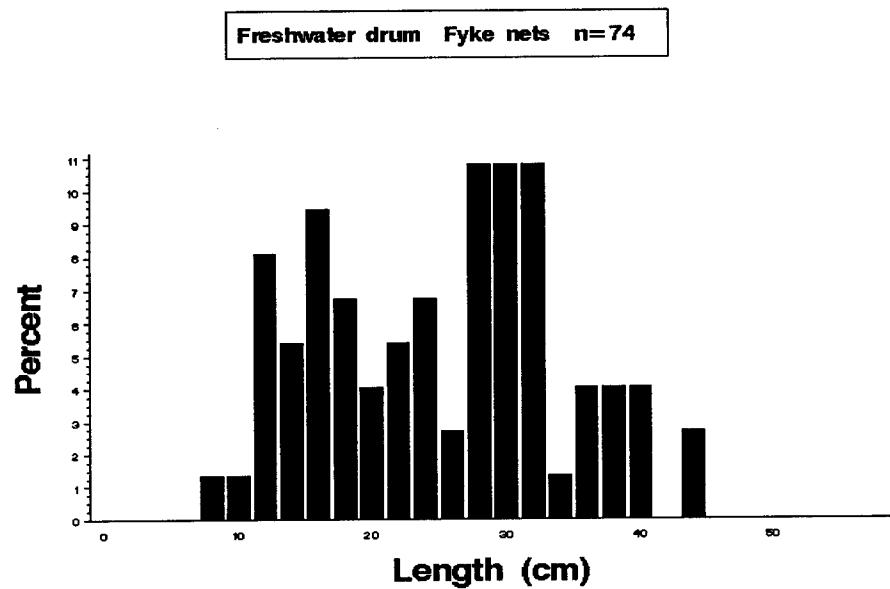


Figure 5.12. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplochitonotus grunniens*) collected by fyke netting in the Upper Mississippi River Open Reach during 1998.

Chapter 6. La Grange Pool, Illinois River

by

Timothy M. O'Hara and Kevin S. Irons

Illinois Natural History Survey
LTRMP Havana Field Station
704 N. Schrader Avenue
Havana, Illinois 62644

Hydrograph

River levels were at flood stage most of January, receding late in the month until the middle of February. The water surface elevation then climbed above flood stage on February 15 and remained high throughout March, April, and May (Figure 6.1). After declining in early June, river levels stayed below flood stage for 10 days and rose again above flood stage at the beginning of period 1 until July 19. River levels declined and remained low and stable for the last two sampling periods. The increase in water level in period 1 allowed easy access into backwaters, but during periods 2 and 3 access was limited with the river levels falling below the mean. Discharge data were obtained from the U.S. Army Corps of Engineers in accordance with the Environmental Management Technical Center established procedures (Wlosinski et al. 1995).

Summary of Sampling Effort

A total of 548 collections were made in 1998—183 in period 1, 181 in period 2, and 184 in period 3 (Table 6.1). Of those, 412 were from randomly selected sites in BWCS, BWCO, SCB, and MCBU strata. Of the 136 collections from fixed sites, 95 were from two TWZ fixed sites and 41 were from one SCB fixed site. Two TWZ sites were sampled, La Grange Lock and Dam and Peoria Lock and Dam; data from both TWZ sites were combined for purposes of this report.

Total Catch

Historical records indicate 115 fish species and 3 hybrids have been collected from La Grange Pool since the late 1800s (Smith 1979). In 1998, 78,007 fish were collected representing 75 species and 3 hybrids (Table 6.2). The five most numerically abundant species were the gizzard shad (36,561), emerald shiner (11,009), white bass

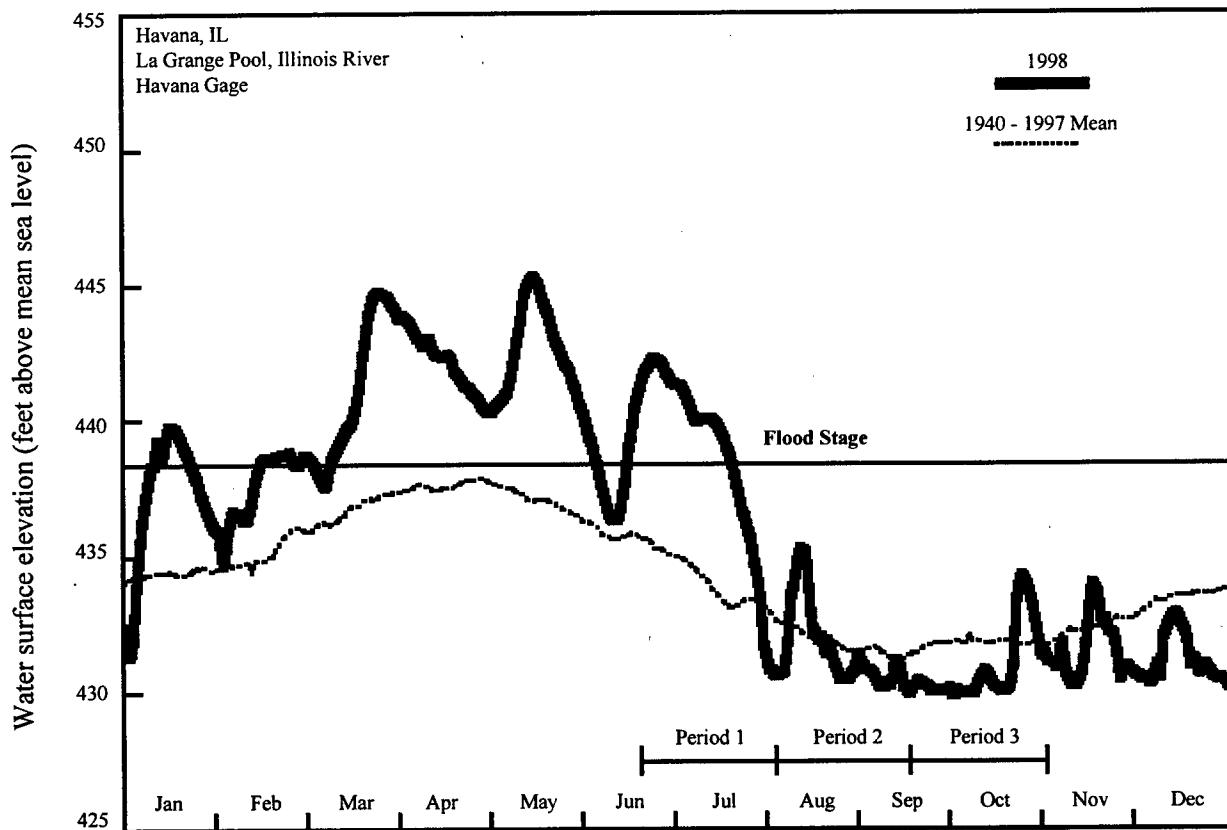


Figure 6.1. Daily water surface elevation from Havana Gage, for La Grange Pool, Illinois River, during 1998 and mean elevation since 1940. The U.S. Army Corps of Engineers discharge data were obtained from the Environmental Management Technical Center (Wlosinski et al. 1995).

(7,858), bluegill (4,917), and common carp (3,072). Total species collected, excluding hybrids, by gear type were 62 by day and night electrofishing combined, 40 by fyke netting, 30 by tandem fyke netting, 56 by mini fyke netting, 25 by tandem mini fyke netting, 40 by seining, 11 by small hoop nets, 13 by large hoop netting, and 4 by trawling. Combined catch for 1990 through 1998 consisted of 615,799 fish representing 83 species and 7 hybrids.

Random Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

For day electrofishing (Table 6.3.1), gizzard shad had the highest poolwide mean catch-per-unit-effort (*C/f*) of 144.65, followed by skipjack herring (16.73) and white bass (16.64). Gizzard shad also had the highest *C/f* in BWCS (70.79), MCBU (172.64), and SCB (134.56) strata. Species with the second and third highest *C/f* by stratum were bluegill (45.74) and common carp (15.97) in the BWCS, skipjack herring (23.22) and white bass (20.33) in the MCBU, and common carp (15.97) and white bass (10.14) in the SCB. Night electrofishing was not conducted at random sites in 1998.

Fyke Net

Poolwide mean *C/f* for fyke netting (Table 6.3.2), based solely on BWCS collections in La Grange Pool, was highest for bluegills (38.97), followed by white bass (26.82) and black crappies (14.08).

Tandem Fyke Net

Poolwide mean *C/f* for tandem fyke netting (Table 6.3.3), based solely on BWCO collections, was highest for white bass (37.91), followed by gizzard shad (16.98) and bluegills (7.70).

Mini Fyke Net

For mini fyke nets (Table 6.3.4), gizzard shad had the highest poolwide mean *C/f* (100.56), followed by emerald shiners (17.70) and white bass (15.72). Gizzard shad also had the highest *C/f* in BWCS (197.85), MCBU (67.90), and SCB (49.30)

strata. The second and third highest *C/f*s, by stratum, were western mosquitofish (23.53) and bluegills (14.19) in the BWCS, emerald shiners (21.43) and white bass (18.33) in the MCBU, and emerald shiners (25.10) and white bass (7.73) in the SCB.

Tandem Mini Fyke Net

Poolwide mean *C/f* for tandem mini fyke netting (Table 6.3.5), based solely on BWCO collections, was highest for gizzard shad (69.71), followed by freshwater drum (5.76) and white bass (2.90).

Small Hoop Net

For small hoop nets (Table 6.3.6), channel catfish had the highest poolwide mean *C/f* (15.16), followed by common carp (3.43) and freshwater drum (0.30). Channel catfish had the highest *C/f* in both MCBU (15.71) and SCB (6.65) strata, followed by common carp (MCBU, 3.46; SCB, 3.01), freshwater drum (MCBU, 0.31), and smallmouth buffalo (SCB, 0.48).

Large Hoop Net

For large hoop nets (Table 6.3.7), smallmouth buffalo had the highest poolwide mean *C/f* (6.65), followed by common carp (4.31) and channel catfish (1.13). Smallmouth buffalo had the highest *C/f* in both MCBU (6.63) and SCB (6.88) strata, followed by common carp (MCBU, 4.28; SCB, 4.66) and channel catfish (MCBU, 1.18; SCB, 0.39).

Seine

Gizzard shad had the highest poolwide mean *C/f* (11.90) for seining (Table 6.3.8), followed by emerald shiners (3.45) and white bass (2.82). Catch rates in all strata types were also highest for gizzard shad (BWCS, 15.46; MCBU, 7.89; and SCB, 53.21), followed by emerald shiners (5.42) in the BWCS and SCB strata (3.50). Bluegills had the third highest *C/f* in the BWCS stratum (3.33). White bass had the second highest *C/f* in the MCBU (3.22) and third highest in the SCB (1.00) strata; emerald shiners (2.72) were third highest in the MCBU stratum.

Fixed Sampling, Mean *C/f* by Gear and Stratum

Day Electrofishing

Gizzard shad had the highest mean *C/f* (447.67) for day electrofishing (Table 6.4.1) at the SCB fixed site, followed by white bass (22.83) and bluegills (18.33). At the TWZ sites, gizzard shad had the highest *C/f* (134.75), followed by white bass (66.83) and emerald shiners (54.25).

Night Electrofishing

For night electrofishing at the SCB site (Table 6.4.2), gizzard shad had the highest *C/f* (117.20), followed by common carp (19.60) and bluegills (13.20). Gizzard shad had the highest *C/f* (173.27) at the TWZ sites, followed by white bass (68.73) and common carp (21.55).

Fyke Net

White bass had the highest *C/f* (59.99) in TWZ fyke nets (Table 6.4.3), followed by bluegills (15.18) and gizzard shad (8.64).

Mini Fyke Net

For mini fyke netting at the SCB site (Table 6.4.4), gizzard shad had the highest *C/f* (82.98), followed by white bass (36.95) and emerald shiners (14.29). At the TWZ sites, emerald shiners had the highest *C/f* (662.34), followed by gizzard shad (181.64) and white bass (34.12).

Small Hoop Net

Common carp had the highest *C/f* (0.34) and freshwater drum (0.09) had the second highest *C/f* for small hoop nets at the SCB site (Table 6.4.5). No other species were caught in small hoop nets at the SCB site. At the TWZ sites, common carp had the highest *C/f* (6.22), followed by smallmouth buffalo (0.25), channel catfish (0.04), flathead catfish (0.04), white bass (0.04), and freshwater drum (0.04).

Large Hoop Net

Common carp had the highest *C/f* (6.01) for large hoop nets at the SCB site (Table 6.4.6), followed by freshwater drum (0.33) and smallmouth buffalo (0.25). At the TWZ sites, smallmouth buffalo had the highest *C/f* (7.46), followed by common carp (7.06) and freshwater drum (2.95).

Seine

For SCB seining (Table 6.4.7), emerald shiners had the highest *C/f* (12.92), followed by gizzard shad (7.83) and bluegills (3.00).

Trawl

Channel catfish had the highest *C/f* (1.42) in TWZ trawls (Table 6.4.8), followed by freshwater drum (0.79), stonewat (0.04), and sauger (0.04).

Length Distributions of Selected Species

Gizzard Shad

The length distribution of 17,894 gizzard shad caught during day and night electrofishing (Table 6.2) shows 78% of the gizzard shad collected were less than 12 cm.

Common Carp

The electrofishing length distribution of 1,927 common carp (Figure 6.3) indicated an abundance of fish from 30 to 50 cm with relatively few fish outside this range. There was a small peak at 22 cm.

Smallmouth Buffalo

Of the 903 smallmouth buffalo collected by electrofishing in 1998 (Figure 6.4), a majority were between 20 to 40 cm, with a peak of 23% in the 28-cm length group.

Hoop net length distribution of 778 smallmouth buffalo (Figure 6.5) shows about 78% of the fish are between the 26- and 42-cm length group. Peaks in the distribution occurred at 28 cm and between 34 and 40 cm.

Channel Catfish

The electrofishing length distribution of 229 channel catfish shows two distinctive peaks at 9 and 34 cm (Figure 6.6). In general, electrofishing showed a wide range of sizes and cohorts.

The length distribution of the channel catfish caught in hoop nets in 1998 shows that almost 30% were 16 cm (Figure 6.7). The 1,065 fish in the distribution ranged from 8 to 72 cm.

White Bass

The length distribution of 3,099 white bass from electrofishing in 1998 (Figure 6.8) shows three peaks at 8, 16, and 30 cm. The white bass collected were from 2 to 40 cm.

Bluegill

A total of 2,451 bluegills were collected during electrofishing in 1998 (Figure 6.9); the fish were almost normally distributed from 2 to 18 cm. The peak was at 10 cm and composed 29% of the distribution.

Catches were combined from fyke and tandem fyke net sets in a length distribution of 1,641 bluegills (Figure 6.10). The distribution was similar to that of electrofishing (Figure 6.10), with the peak being at 10 cm.

Largemouth Bass

The electrofishing length distribution of 537 largemouth bass (Figure 6.11) indicated fish were distributed from 2 to 48 cm, with peaks evident at 8, 24, and 32 cm.

White Crappie

A total of 190 white crappies were collected in fyke and tandem fyke nets in 1998 (Figure 6.12). Fish were distributed from 6 to 30 cm long with 81% of the white crappies between 16 and 24 cm.

Black Crappie

In 1998, 534 black crappies were collected from fyke and tandem fyke nets (Figure 6.13); 28% of the black crappies were 22 cm long and 36% were <20 cm.

Sauger

A total of 356 saugers were collected during electrofishing in 1998 (Figure 6.14). Fish lengths ranged from 6 to 48 cm with two peaks in the distribution, one at 12 cm and the other at 42 cm. Sauger were absent in the 30-cm length group.

Freshwater Drum

The electrofishing length distribution (Figure 6.15) of 935 freshwater drum shows fish from 2 to 54 cm. The fish were relatively evenly distributed, only one peak at 10 cm was evident in the length distribution and consisted of 22% of the total fish.

A total of 392 freshwater drum were collected in fyke and tandem fyke nets. These fish were distributed from 6 to 44 cm, with peaks at 10 and 22 cm (Figure 6.16).

Table 6.1. Allocation of fish sampling effort among strata by the Long Term Resource Monitoring Program in the La Grange Pool of the Illinois River during 1998. Table entries are numbers of successfully completed standardized monitoring collections.

Table page: 1

Sampling period=1: June 15 - July 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	11		14	12					4	41
Fyke net	10								4	14
Large hoop net			8	8					4	20
Small hoop net			8	8					4	20
Mini fyke net	10			8	8				4	30
Night electrofishing				2					4	6
Seine	8			12	12				8	32
Trawling										8
Tandem fyke net		6								6
Tandem mini fyke net		6								6
SUBTOTAL	39	12	52	48	0	0	0	0	32	183

Sampling period=2: August 1 - September 14

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	11		14	12					4	41
Fyke net	10								4	14
Large hoop net			8	8					4	20
Small hoop net			8	8					4	20
Mini fyke net	10			8	8				4	30
Night electrofishing				1					3	4
Seine	8			12	12				8	32
Trawling										8
Tandem fyke net		6								6
Tandem mini fyke net		6								6
SUBTOTAL	39	12	51	48	0	0	0	0	31	181

Sampling period=3: September 15 - October 31

Sampling gear	BWCS	BWCO	SCB	MCBU	MCBW	IMPS	IMPO	TRI	TWZ	TOTAL
Day electrofishing	12		14	12					4	42
Fyke net	10								4	14
Large hoop net			8	8					4	20
Small hoop net			8	8					4	20
Mini fyke net	10			8	8				4	30
Night electrofishing				2					4	6
Seine	8			12	12				8	32
Trawling										8
Tandem fyke net		6								6
Tandem mini fyke net		6								6
SUBTOTAL	40	12	52	48	0	0	0	0	32	184
	====	====	==	====	====	====	====	====	====	=====
	118	36	155	144	0	0	0	0	95	548

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach. Table page: 1

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
1	Chestnut lamprey	<i>Ichthyomyzon castaneus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
2	Paddlefish	<i>Polyodon spathula</i>	2	-	-	-	-	-	-	-	-	-	-	-	2
3	Spotted gar	<i>Lepisosteus osseus</i>	4	1	2	-	-	4	-	-	-	-	-	-	11
4	Longnose gar	<i>Lepisosteus osseus</i>	18	14	11	1	9	-	-	-	-	-	-	-	54
5	Shortnose gar	<i>Lepisosteus osseus</i>	29	13	51	48	21	5	1	-	-	-	-	-	168
6	Bowfin	<i>Amia calva</i>	3	-	1	-	-	-	-	-	-	-	-	-	5
7	Goldeye	<i>Hiodon alosoides</i>	2	3	-	-	-	-	-	-	-	-	-	-	5
8	Mooneye	<i>Hiodon tergisus</i>	1	-	-	-	-	-	-	-	-	-	-	-	1
9	Skipjack herring	<i>Alosa chrysichloris</i>	1308	32	11	1	8	3	47	-	-	-	-	-	1410
10	Gizzard shad	<i>Dorosoma cepedianum</i>	17769	2492	309	605	10918	2422	2026	-	20	-	-	-	36561
11	Threadfin shad	<i>Dorosoma petenense</i>	3556	50	84	37	109	34	34	-	-	-	-	-	704
12	Central stoneroller	<i>Campostoma anomalum</i>	2	-	-	-	2	-	-	-	-	-	-	-	4
13	Goldfish	<i>Carassius auratus</i>	4	4	3	-	-	-	-	-	-	-	-	-	11
14	Grass carp	<i>Ctenopharyngodon idella</i>	23	2	1	1	2	-	-	-	-	-	-	-	30
15	Red shiner	<i>Cyprinella lutrensis</i>	14	-	-	-	-	-	-	-	-	-	-	-	126
16	Common carp	<i>Cyprinus carpio</i>	1592	335	63	19	23	4	-	-	-	-	-	-	3072
17	Common carp x goldfish	<i>Cyprinus carpio x C. auratus</i>	18	2	2	1	-	-	-	-	-	-	-	-	24
18	Silver carp	<i>Hypophthalmichthys molitrix</i>	2	-	-	-	-	-	-	-	-	-	-	-	2
19	Bighead carp	<i>Hypophthalmichthys molitrix</i>	-	-	1	-	-	-	-	-	-	-	-	-	1
20	Silver chub	<i>Macropodus chinensis</i>	12	-	-	-	-	-	-	-	-	-	-	-	2
21	Golden shiner	<i>Notemigonus crysoleucas</i>	14	3	-	-	-	-	-	-	-	-	-	-	70
22	Emerald shiner	<i>Notropis atherinoides</i>	1274	204	-	-	-	-	-	-	-	-	-	-	54
23	River shiner	<i>Notropis bleekeri</i>	-	-	-	-	-	-	-	-	-	-	-	-	11009
24	Spottail shiner	<i>Notropis hudsonius</i>	5	-	-	-	-	-	-	-	-	-	-	-	1
25	Silverband shiner	<i>Notropis shumardi</i>	12	3	-	-	-	-	-	-	-	-	-	-	39
26	Sand shiner	<i>Notropis stramineus</i>	-	-	-	-	-	-	-	-	-	-	-	-	185
27	Suckermouth minnow	<i>Phenacobius mirabilis</i>	-	-	-	-	-	-	-	-	-	-	-	-	4
28	Bluntnose minnow	<i>Pimephales notatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	54
29	Fathead minnow	<i>Pimephales promelas</i>	-	-	-	-	-	-	-	-	-	-	-	-	399
30	Bullhead minnow	<i>Pimephales Vigilax</i>	36	2	-	-	-	-	-	-	-	-	-	-	277
31	Blacknose dace	<i>Rhinichthys atratulus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
32	Creek chub	<i>Semotilus atromaculatus</i>	-	-	-	-	-	-	-	-	-	-	-	-	1
33	River carpsucker	<i>Carpiodon carpio</i>	112	10	75	29	4	1	23	1	-	-	-	-	24
34	Quillback	<i>Carpiodon cyprinus</i>	-	-	9	1	-	-	-	-	-	-	-	-	266
35	Highfin carpsucker	<i>Carpiodon velifer</i>	3	1	3	-	-	-	-	-	-	-	-	-	11
36	White sucker	<i>Catostomus commersoni</i>	-	-	-	-	-	-	-	-	-	-	-	-	7
37	Smallmouth buffalo	<i>Ictalurus bubalus</i>	761	142	94	41	3	2	3	2	36	-	-	-	10
38	Bigmouth buffalo	<i>Ictalurus cyprinellus</i>	408	73	1	4	-	-	-	-	-	-	-	-	1824
39	Black buffalo	<i>Ictalurus niger</i>	28	4	-	-	-	-	-	-	-	-	-	-	486
															41

Gears: D - Day electrofishing
N - Night electrofishing
F - Fyke netting
X - Tandem fyke netting
M - Mini fyke netting
Y - Tandem mini fyke netting

S - Seining
HS - Small hoop netting
HL - Large hoop netting
G - Gill netting
TA - Traumel netting, anchored sets
T - Trawling (4.8-m bottom trawl)

Table 6.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
40	Unidentified buffalo	Ictalurus sp.	3	1	-	-	98	1	5	-	-	-	-	-	108
41	Silver redhorse	Moxostoma anisurum	2	-	1	-	-	-	-	-	-	-	-	-	3
42	Golden redhorse	Moxostoma erythrurum	7	-	1	-	23	9	3	2	-	-	-	-	8
43	Shortthead redhorse	Moxostoma macrolepidotum	78	1	55	4	19	59	-	-	1	-	-	-	172
44	Black bullhead	Ameiurus melas	5	-	-	10	20	16	-	-	1	-	-	-	87
45	Yellow bullhead	Ameiurus natalis	3	-	-	13	35	2	-	-	-	-	-	-	51
46	Brown bullhead	Ameiurus nebulosus	2	-	-	21	2	84	4	57	-	-	-	-	53
47	Channel catfish	Ictalurus punctatus	218	11	-	-	-	-	-	-	-	-	-	-	1496
48	Stonecat	Noturus flavus	1	-	-	-	-	-	-	-	-	-	-	-	2
49	Radpole madtom	Noturus gyrinus	45	8	1	-	-	-	2	-	-	-	-	-	2
50	Flathead catfish	Pygocentrus olivaris	-	-	-	-	-	-	6	1	-	2	-	-	72
51	Grass pickerel	Esox americanus vermiculatus	-	-	-	4	2	-	1	-	1	-	-	-	2
52	Northern pike	Esox lucius	-	-	-	-	-	-	-	-	-	-	-	-	7
53	Pirate perch	Aphredoderus sayanus	3	-	-	-	-	-	1	-	-	-	-	-	4
54	Blackstripe topminnow	Fundulus notatus	2	-	-	-	-	-	38	-	3	-	-	-	43
55	Western mosquitofish	Gambusia affinis	2	-	-	-	-	-	807	-	95	-	-	-	904
56	Brook silverside	Labidesthes sicculus	33	6	-	-	-	-	51	-	24	-	-	-	114
57	White perch	Morone americana	9	17	12	-	-	-	4	-	-	-	-	-	42
58	White bass	Morone chrysops	2301	798	1530	1371	1522	103	211	17	5	-	-	-	7858
59	Yellow bass	Morone mississippiensis	28	15	20	16	2	2	1	-	-	-	-	-	85
60	Striped bass	Morone saxatilis	3	3	-	-	-	-	-	-	-	-	-	-	6
61	Striped bass x white bass	M. saxatilis x M. chrysops	3	5	1	-	-	-	-	-	-	-	-	-	10
62	Green sunfish	Lepomis cyanellus	45	4	11	-	-	-	-	-	-	-	-	-	82
63	Warmouth	Lepomis gulosus	17	-	2	1	-	-	-	-	-	-	-	-	36
64	Orangespotted sunfish	Lepomis humilis	52	2	1	3	-	-	29	-	11	-	-	-	98
65	Bluegill	Lepomis macrochirus	2190	261	1370	271	659	11	152	3	-	-	-	-	4917
66	Redear sunfish	Lepomis microlophus	2	-	1	2	-	-	-	-	-	-	-	-	5
67	Green sunfish x bluegill	L. cyanellus x L. macrochirus	6	-	3	1	-	-	-	-	-	-	-	-	11
68	Smallmouth bass	Micropterus dolomieu	4	2	-	-	-	-	-	-	3	-	-	-	9
69	Largemouth bass	Micropterus salmoides	486	51	31	16	99	-	-	47	-	-	-	-	730
70	White crappie	Pomoxis annularis	282	15	164	26	61	9	7	1	-	-	-	-	565
71	Black crappie	Pomoxis nigromaculatus	308	15	461	73	75	4	10	-	-	-	-	-	946
72	Mud darter	Etheostoma asprigene	3	-	-	-	-	-	10	-	-	-	-	-	15
73	Johnny darter	Etheostoma nigrum	-	-	-	-	-	-	1	-	2	-	-	-	3
74	Logperch	Percina caprodes	12	-	-	-	-	-	33	-	5	-	-	-	50
75	Blackside darter	Percina maculata	-	-	-	-	-	-	1	-	1	-	-	-	2
76	Slenderhead darter	Percina phoxocephala	3	-	-	-	-	-	1	-	3	-	-	-	7
77	Sauger	Stizostedion canadense	238	118	61	14	70	15	9	-	3	-	-	-	529
78	Walleye	Stizostedion vitreum	5	7	5	-	-	-	-	-	1	-	-	-	19

Gears: D = Day electrofishing
 N = Night electrofishing
 F = Fyke netting
 X = Tandem fyke netting
 M = Mini fyke netting
 Y = Tandem mini fyke netting

S = Seining
 HS = Small hoop netting
 HL = Large hoop netting
 G = Gill netting
 TA = Trammel netting, anchored sets
 T = Trawling (4.8-m bottom trawl)

Table 6.2. Total catches, by gear type, of fishes collected by the Long Term Resource Program during 1998 in the La Grange Pool of the Illinois River. See Table 6.1 for the list of sampling gears actually deployed in this study reach.

Species	Common name	Scientific name	D	N	F	X	M	Y	S	HS	HL	G	TA	T	TOTAL
79	Freshwater drum	<i>Aplodinotus grunniens</i>	783	152	245	147	191	202	51	21	119	-	-	19	1930
80	Unidentified herring	<i>Clupeidae</i>	20	-	-	-	-	-	-	-	-	-	-	-	20

31018	4883	4751	2833	24949	2866	3551	1494	1607	0	0	55	78007
-------	------	------	------	-------	------	------	------	------	---	---	----	-------

Gears: D - Day electrofishing
 N - Night electrofishing
 F - Fyke netting
 X - Tandem fyke netting
 M - Mini fyke netting
 Y - Tandem mini fyke netting
 S - Seining
 HS - Small hoop netting
 HL - Large hoop netting
 G - Gill netting
 TA - Trammel netting, anchored sets
 T - Trawling (4.8-m bottom trawl)

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	SCB
Chestnut lamprey	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Spotted gar	0.02 (0.01)	0.06 (0.04)	0.00 (0.00)	0.00 (0.00)
Longnose gar	0.15 (0.05)	0.12 (0.07)	0.17 (0.07)	0.08 (0.06)
Shortnose gar	0.15 (0.06)	0.29 (0.16)	0.08 (0.06)	0.28 (0.10)
Bowfin	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Goldeye	0.04 (0.03)	0.00 (0.00)	0.06 (0.04)	0.00 (0.00)
Skipjack herring	16.73 (5.54)	0.41 (0.23)	23.22 (7.96)	9.75 (3.34)
Gizzard shad	144.65 (30.79)	70.79 (13.51)	172.64 (43.95)	134.56 (31.97)
Threadfin shad	3.38 (1.05)	0.79 (0.30)	4.42 (1.51)	2.17 (0.66)
Central stoneroller	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Goldfish	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Grass carp	0.16 (0.05)	0.35 (0.14)	0.08 (0.05)	0.14 (0.06)
Red shiner	0.06 (0.04)	0.03 (0.03)	0.06 (0.06)	0.25 (0.09)
Common carp	9.41 (1.05)	15.97 (2.18)	6.56 (1.24)	15.97 (4.09)
Carp x goldfish hybrid	0.11 (0.06)	0.21 (0.10)	0.08 (0.08)	0.03 (0.03)
Silver carp	0.04 (0.04)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)
Silver chub	0.11 (0.06)	0.03 (0.03)	0.14 (0.09)	0.14 (0.07)
Golden shiner	0.07 (0.03)	0.18 (0.09)	0.03 (0.03)	0.17 (0.09)
Emerald shiner	9.35 (6.20)	0.71 (0.24)	12.94 (8.92)	3.33 (0.81)
Spottail shiner	0.04 (0.02)	0.06 (0.04)	0.03 (0.03)	0.06 (0.06)
Silverband shiner	0.16 (0.08)	0.03 (0.03)	0.22 (0.12)	0.06 (0.04)
Bullhead minnow	0.35 (0.11)	0.18 (0.09)	0.42 (0.16)	0.31 (0.12)
River carpsucker	0.82 (0.16)	1.53 (0.45)	0.56 (0.15)	0.92 (0.17)
Highfin carpsucker	0.02 (0.01)	0.06 (0.04)	0.00 (0.00)	0.03 (0.03)
Smallmouth buffalo	5.75 (0.83)	12.41 (2.44)	3.42 (0.78)	3.67 (0.82)
Bigmouth buffalo	2.43 (0.51)	4.97 (1.30)	1.39 (0.55)	3.92 (1.58)
Black buffalo	0.13 (0.03)	0.38 (0.11)	0.03 (0.03)	0.28 (0.12)
Unidentified buffalo	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)	0.06 (0.04)
Silver redhorse	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.03 (0.03)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	SCB
Golden redhorse	0.12 (0.07)	0.00 (0.00)	0.17 (0.10)	0.00 (0.00)
Shorthead redhorse	0.44 (0.16)	0.18 (0.08)	0.53 (0.23)	0.67 (0.22)
Black bullhead	0.08 (0.05)	0.00 (0.00)	0.11 (0.08)	0.00 (0.00)
Yellow bullhead	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.03 (0.03)
Brown bullhead	0.02 (0.01)	0.06 (0.04)	0.00 (0.00)	0.00 (0.00)
Channel catfish	1.79 (0.39)	2.00 (0.49)	1.69 (0.53)	2.00 (0.50)
Stonecat	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Flathead catfish	0.26 (0.06)	0.15 (0.06)	0.28 (0.09)	0.56 (0.15)
Pirate perch	0.02 (0.01)	0.09 (0.05)	0.00 (0.00)	0.00 (0.00)
Blackstripe topminnow	0.02 (0.01)	0.06 (0.04)	0.00 (0.00)	0.00 (0.00)
Western mosquitofish	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.03 (0.03)
Brook silverside	0.19 (0.08)	0.71 (0.30)	0.00 (0.00)	0.17 (0.07)
White perch	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
White bass	16.64 (2.80)	7.79 (1.67)	20.33 (3.98)	10.14 (2.07)
-Yellow bass	0.16 (0.09)	0.15 (0.12)	0.17 (0.12)	0.06 (0.04)
Striped bass	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.03 (0.03)
Striped x white bass	0.04 (0.04)	0.00 (0.00)	0.06 (0.06)	0.03 (0.03)
Green sunfish	0.28 (0.14)	1.00 (0.52)	0.03 (0.03)	0.08 (0.06)
Warmouth	0.11 (0.03)	0.35 (0.11)	0.03 (0.03)	0.06 (0.04)
Orangespotted sunfish	0.32 (0.09)	1.21 (0.35)	0.00 (0.00)	0.31 (0.11)
Bluegill	12.70 (2.56)	45.74 (9.93)	0.89 (0.23)	6.36 (1.94)
Redear sunfish	0.02 (0.02)	0.06 (0.06)	0.00 (0.00)	0.00 (0.00)
Green x bluegill sunfish	0.05 (0.02)	0.18 (0.09)	0.00 (0.00)	0.00 (0.00)
Largemouth bass	3.27 (0.43)	9.50 (1.53)	1.08 (0.26)	1.39 (0.46)
White crappie	1.77 (0.59)	6.65 (2.30)	0.06 (0.04)	0.47 (0.15)
Black crappie	1.96 (0.51)	6.68 (1.95)	0.28 (0.15)	0.89 (0.31)
Mud darter	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.03 (0.03)
Logperch	0.11 (0.06)	0.03 (0.03)	0.14 (0.09)	0.17 (0.07)
Slenderhead darter	0.03 (0.02)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 3

Common name	ALL	BWCS	MCBU	SCB
Sauger	1.92 (0.33)	1.03 (0.28)	2.25 (0.46)	1.86 (0.31)
Walleye	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.04)
Freshwater drum	6.08 (1.25)	7.03 (1.56)	5.56 (1.70)	8.78 (2.44)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS
Spotted gar	0.03 (0.03)	0.03 (0.03)
Shortnose gar	0.47 (0.15)	0.47 (0.16)
Bowfin	0.03 (0.03)	0.03 (0.03)
Skipjack herring	0.13 (0.13)	0.13 (0.13)
Gizzard shad	6.87 (3.13)	6.87 (3.14)
Threadfin shad	1.82 (0.79)	1.82 (0.79)
Goldfish	0.04 (0.03)	0.04 (0.04)
Grass carp	0.03 (0.03)	0.03 (0.03)
Common carp	1.56 (0.50)	1.56 (0.50)
Carp x goldfish hybrid	0.06 (0.06)	0.06 (0.06)
Bighead carp	0.03 (0.03)	0.03 (0.03)
River carpsucker	1.70 (0.40)	1.70 (0.40)
Quillback	0.24 (0.24)	0.24 (0.24)
Highfin carpsucker	0.10 (0.08)	0.10 (0.08)
Smallmouth buffalo	2.17 (1.09)	2.17 (1.09)
Bigmouth buffalo	0.03 (0.03)	0.03 (0.03)
Black buffalo	0.04 (0.04)	0.04 (0.04)
Silver redhorse	0.03 (0.03)	0.03 (0.03)
Golden redhorse	0.03 (0.03)	0.03 (0.03)
Shorthead redhorse	1.38 (0.36)	1.38 (0.36)
Black bullhead	0.14 (0.08)	0.14 (0.08)
Yellow bullhead	0.33 (0.11)	0.33 (0.11)
Brown bullhead	0.44 (0.23)	0.44 (0.23)
Channel catfish	0.64 (0.38)	0.64 (0.38)
Flathead catfish	0.03 (0.03)	0.03 (0.03)
Northern pike	0.04 (0.04)	0.04 (0.04)
White bass	26.82 (10.90)	26.82 (10.95)
Yellow bass	0.47 (0.17)	0.47 (0.18)
Green sunfish	0.26 (0.12)	0.26 (0.12)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS
Warmouth	0.06 (0.04)	0.06 (0.04)
Orangespotted sunfish	0.03 (0.03)	0.03 (0.03)
Bluegill	38.97 (18.22)	38.97 (18.30)
Redear sunfish	0.03 (0.03)	0.03 (0.03)
Green x bluegill sunfish	0.10 (0.10)	0.10 (0.10)
Largemouth bass	0.82 (0.34)	0.82 (0.34)
White crappie	4.87 (2.02)	4.87 (2.03)
Black crappie	14.08 (3.81)	14.08 (3.83)
Sauger	0.73 (0.47)	0.73 (0.47)
Freshwater drum	5.11 (1.86)	5.11 (1.86)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO
Longnose gar	0.03 (0.03)	0.03 (0.03)
Shortnose gar	1.29 (0.79)	1.29 (0.79)
Skipjack herring	0.03 (0.03)	0.03 (0.03)
Gizzard shad	16.98 (4.31)	16.98 (4.32)
Threadfin shad	1.03 (0.36)	1.03 (0.36)
Grass carp	0.03 (0.03)	0.03 (0.03)
Common carp	0.53 (0.13)	0.53 (0.13)
Carp x goldfish hybrid	0.03 (0.03)	0.03 (0.03)
River carpsucker	0.80 (0.31)	0.80 (0.31)
Quillback	0.03 (0.03)	0.03 (0.03)
Smallmouth buffalo	1.15 (0.48)	1.15 (0.48)
Bigmouth buffalo	0.11 (0.05)	0.11 (0.05)
Black buffalo	0.03 (0.03)	0.03 (0.03)
Shorthead redhorse	0.64 (0.46)	0.64 (0.46)
Black bullhead	0.54 (0.26)	0.54 (0.26)
Yellow bullhead	0.56 (0.29)	0.56 (0.29)
Brown bullhead	0.99 (0.37)	0.99 (0.37)
Channel catfish	0.05 (0.04)	0.05 (0.04)
Northern pike	0.06 (0.05)	0.06 (0.06)
White bass	37.91 (22.70)	37.91 (22.73)
Yellow bass	0.45 (0.12)	0.45 (0.12)
Striped x white bass	0.03 (0.03)	0.03 (0.03)
Warmouth	0.03 (0.03)	0.03 (0.03)
Orangespotted sunfish	0.08 (0.06)	0.08 (0.06)
Bluegill	7.70 (3.90)	7.70 (3.90)
Redear sunfish	0.06 (0.06)	0.06 (0.06)
Green x bluegill sunfish	0.03 (0.03)	0.03 (0.03)
Largemouth bass	0.44 (0.22)	0.44 (0.22)
White crappie	0.75 (0.40)	0.75 (0.40)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCO
Black crappie	2.09 (1.20)	2.09 (1.20)
Sauger	0.39 (0.20)	0.39 (0.20)
Walleye	0.03 (0.03)	0.03 (0.03)
Freshwater drum	4.12 (2.20)	4.12 (2.20)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	SCB
Spotted gar	0.05 (0.04)	0.07 (0.07)	0.04 (0.04)	0.06 (0.06)
Longnose gar	0.12 (0.05)	0.13 (0.07)	0.13 (0.07)	0.06 (0.06)
Shortnose gar	0.38 (0.16)	0.23 (0.08)	0.46 (0.22)	0.06 (0.06)
Bowfin	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Skipjack herring	0.04 (0.03)	0.00 (0.00)	0.04 (0.04)	0.27 (0.27)
Gizzard shad	100.56 (39.70)	197.85 (140.44)	67.90 (23.85)	49.30 (20.00)
Threadfin shad	1.01 (0.66)	3.27 (2.53)	0.21 (0.12)	0.41 (0.30)
Central stoneroller	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
Grass carp	0.02 (0.02)	0.07 (0.07)	0.00 (0.00)	0.00 (0.00)
Red shiner	2.19 (1.41)	0.06 (0.04)	3.09 (2.03)	0.61 (0.30)
Common carp	0.24 (0.10)	0.13 (0.08)	0.30 (0.14)	0.00 (0.00)
Silver chub	0.25 (0.13)	0.04 (0.04)	0.34 (0.19)	0.17 (0.09)
Golden shiner	0.57 (0.41)	0.19 (0.13)	0.74 (0.58)	0.11 (0.08)
Emerald shiner	17.70 (9.84)	6.29 (3.19)	21.43 (14.05)	25.10 (16.02)
River shiner	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Spottail shiner	0.21 (0.12)	0.03 (0.03)	0.29 (0.18)	0.00 (0.00)
Silverband shiner	3.25 (2.55)	0.16 (0.08)	4.53 (3.67)	1.19 (0.47)
Sand shiner	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Suckermouth minnow	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Bluntnose minnow	10.58 (8.76)	0.13 (0.08)	15.14 (12.59)	0.06 (0.06)
Bullhead minnow	1.10 (0.50)	2.34 (1.69)	0.66 (0.35)	0.71 (0.54)
Creek chub	0.07 (0.06)	0.03 (0.03)	0.08 (0.08)	0.00 (0.00)
River carpsucker	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.06 (0.06)
Quillback	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Smallmouth buffalo	0.02 (0.02)	0.07 (0.07)	0.00 (0.00)	0.06 (0.06)
Black buffalo	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Unidentified buffalo	1.91 (1.16)	0.24 (0.18)	2.64 (1.66)	0.23 (0.18)
Shorthead redhorse	0.07 (0.04)	0.03 (0.03)	0.09 (0.06)	0.06 (0.06)
Black bullhead	1.02 (0.50)	0.37 (0.23)	1.33 (0.71)	0.05 (0.05)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	SCB
Yellow bullhead	0.14 (0.06)	0.31 (0.19)	0.08 (0.06)	0.00 (0.00)
Brown bullhead	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Channel catfish	1.24 (0.40)	0.55 (0.23)	1.50 (0.57)	1.20 (0.37)
Tadpole madtom	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.06 (0.06)
Flathead catfish	0.04 (0.03)	0.00 (0.00)	0.04 (0.04)	0.22 (0.22)
Grass pickerel	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Pirate perch	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Blackstripe topminnow	0.43 (0.27)	1.00 (0.81)	0.24 (0.24)	0.06 (0.06)
Western mosquitofish	8.70 (6.25)	23.53 (22.68)	3.77 (3.28)	0.05 (0.05)
Brook silverside	0.37 (0.25)	1.38 (0.99)	0.00 (0.00)	0.22 (0.17)
White perch	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.06)
White bass	15.72 (3.23)	10.08 (5.23)	18.33 (4.22)	7.73 (3.49)
Yellow bass	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.06 (0.06)
Green sunfish	0.14 (0.07)	0.33 (0.23)	0.08 (0.06)	0.06 (0.06)
Warmouth	0.13 (0.09)	0.49 (0.33)	0.00 (0.00)	0.00 (0.00)
Orangespotted sunfish	0.27 (0.07)	0.56 (0.20)	0.16 (0.08)	0.17 (0.09)
Bluegill	4.97 (1.98)	14.19 (7.61)	1.75 (0.47)	2.08 (1.28)
Green x bluegill sunfish	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Largemouth bass	1.17 (0.31)	0.45 (0.22)	1.48 (0.43)	0.56 (0.21)
White crappie	0.38 (0.16)	0.45 (0.14)	0.32 (0.22)	0.76 (0.54)
Black crappie	0.86 (0.24)	1.13 (0.48)	0.79 (0.30)	0.34 (0.14)
Mud darter	0.15 (0.08)	0.00 (0.00)	0.21 (0.12)	0.06 (0.06)
Johnny darter	0.03 (0.03)	0.00 (0.00)	0.04 (0.04)	0.00 (0.00)
Logperch	0.38 (0.14)	0.35 (0.22)	0.41 (0.18)	0.00 (0.00)
Blackside darter	0.01 (0.01)	0.03 (0.03)	0.00 (0.00)	0.00 (0.00)
Sauger	1.08 (0.26)	0.13 (0.06)	1.48 (0.37)	0.29 (0.14)
Freshwater drum	3.19 (0.96)	1.20 (0.52)	4.03 (1.36)	1.63 (0.49)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using tandem mini fyke netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCO
Shortnose gar	0.13 (0.13)	0.13 (0.13)
Skipjack herring	0.08 (0.06)	0.08 (0.06)
Gizzard shad	69.71 (61.03)	69.71 (61.11)
Threadfin shad	0.95 (0.65)	0.95 (0.65)
Common carp	0.11 (0.08)	0.11 (0.08)
Silver chub	0.03 (0.03)	0.03 (0.03)
Emerald shiner	0.69 (0.45)	0.69 (0.45)
Silverband shiner	0.03 (0.03)	0.03 (0.03)
Fathead minnow	0.03 (0.03)	0.03 (0.03)
Bullhead minnow	0.21 (0.18)	0.21 (0.18)
River carpsucker	0.03 (0.03)	0.03 (0.03)
Smallmouth buffalo	0.08 (0.08)	0.08 (0.08)
Unidentified buffalo	0.03 (0.03)	0.03 (0.03)
Shorthead redhorse	0.08 (0.08)	0.08 (0.08)
Yellow bullhead	0.06 (0.04)	0.06 (0.04)
Brown bullhead	0.03 (0.03)	0.03 (0.03)
Channel catfish	0.11 (0.05)	0.11 (0.05)
Flathead catfish	0.03 (0.03)	0.03 (0.03)
White bass	2.90 (1.82)	2.90 (1.82)
Yellow bass	0.05 (0.04)	0.05 (0.04)
Green sunfish	0.03 (0.03)	0.03 (0.03)
Bluegill	0.29 (0.18)	0.29 (0.18)
White crappie	0.26 (0.11)	0.26 (0.11)
Black crappie	0.10 (0.10)	0.10 (0.10)
Sauger	0.41 (0.26)	0.41 (0.26)
Freshwater drum	5.76 (3.41)	5.76 (3.42)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.3.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	SCB
Common carp	3.43 (0.86)	3.46 (0.91)	3.01 (0.92)
Carp x goldfish hybrid	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
River carpsucker	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Smallmouth buffalo	0.29 (0.12)	0.27 (0.13)	0.48 (0.33)
Black buffalo	0.02 (0.02)	0.02 (0.02)	0.00 (0.00)
Channel catfish	15.16 (5.34)	15.71 (5.70)	6.65 (2.71)
Flathead catfish	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
White bass	0.12 (0.10)	0.11 (0.11)	0.31 (0.26)
Yellow bass	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Bluegill	0.04 (0.04)	0.04 (0.04)	0.03 (0.03)
White crappie	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
Freshwater drum	0.30 (0.16)	0.31 (0.17)	0.11 (0.05)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.3.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	MCBU	SCB
Gizzard shad	0.18 (0.09)	0.17 (0.09)	0.34 (0.20)
Common carp	4.31 (1.28)	4.28 (1.37)	4.66 (1.51)
Bighead carp	0.00 (0.00)	0.00 (0.00)	0.03 (0.03)
River carpsucker	0.12 (0.07)	0.12 (0.08)	0.08 (0.05)
Smallmouth buffalo	6.65 (1.31)	6.63 (1.38)	6.88 (3.68)
Black buffalo	0.04 (0.03)	0.04 (0.03)	0.06 (0.06)
Shorthead redhorse	0.02 (0.02)	0.02 (0.02)	0.00 (0.00)
Channel catfish	1.13 (0.52)	1.18 (0.55)	0.39 (0.20)
Flathead catfish	0.04 (0.04)	0.04 (0.04)	0.00 (0.00)
White bass	0.03 (0.02)	0.02 (0.02)	0.11 (0.09)
Sauger	0.04 (0.03)	0.04 (0.03)	0.03 (0.03)
Freshwater drum	0.77 (0.26)	0.80 (0.28)	0.20 (0.12)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	ALL	BWCS	MCBU	SCB
Longnose gar	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Shortnose gar	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Skipjack herring	0.79 (0.39)	0.04 (0.04)	1.11 (0.56)	0.13 (0.07)
Gizzard shad	11.90 (2.51)	15.46 (4.58)	7.89 (2.04)	53.21 (38.11)
Threadfin shad	0.39 (0.16)	0.04 (0.04)	0.53 (0.22)	0.25 (0.14)
Red shiner	0.22 (0.12)	0.04 (0.04)	0.28 (0.18)	0.33 (0.29)
Silver chub	0.30 (0.08)	0.13 (0.09)	0.33 (0.11)	0.88 (0.38)
Golden shiner	0.08 (0.04)	0.08 (0.06)	0.08 (0.05)	0.08 (0.06)
Emerald shiner	3.45 (0.91)	5.42 (2.51)	2.72 (0.92)	3.50 (0.93)
Spottail shiner	0.04 (0.02)	0.08 (0.06)	0.03 (0.03)	0.04 (0.04)
Silverband shiner	0.35 (0.13)	0.04 (0.04)	0.47 (0.18)	0.33 (0.17)
Sand shiner	0.03 (0.03)	0.13 (0.13)	0.00 (0.00)	0.00 (0.00)
Suckermouth minnow	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Bluntnose minnow	0.09 (0.04)	0.13 (0.09)	0.06 (0.04)	0.42 (0.26)
Bullhead minnow	1.22 (0.41)	2.79 (1.32)	0.67 (0.32)	0.83 (0.25)
Blacknose dace	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
River carpsucker	0.26 (0.10)	0.79 (0.37)	0.08 (0.05)	0.04 (0.04)
Smallmouth buffalo	0.02 (0.02)	0.08 (0.08)	0.00 (0.00)	0.00 (0.00)
Unidentified buffalo	0.04 (0.02)	0.13 (0.09)	0.00 (0.00)	0.08 (0.06)
Shorthead redhorse	0.02 (0.01)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)
Channel catfish	0.67 (0.35)	0.08 (0.06)	0.86 (0.51)	0.96 (0.46)
Grass pickerel	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Blackstripe topminnow	0.02 (0.01)	0.08 (0.06)	0.00 (0.00)	0.04 (0.04)
Western mosquitofish	0.74 (0.32)	2.38 (1.23)	0.14 (0.08)	0.63 (0.20)
Brook silverside	0.21 (0.12)	0.63 (0.47)	0.06 (0.04)	0.21 (0.12)
White bass	2.82 (0.54)	2.04 (0.73)	3.22 (0.73)	1.00 (0.41)
Yellow bass	0.02 (0.02)	0.00 (0.00)	0.03 (0.03)	0.00 (0.00)
Orangespotted sunfish	0.12 (0.07)	0.46 (0.28)	0.00 (0.00)	0.00 (0.00)
Bluegill	1.15 (0.21)	3.33 (0.75)	0.36 (0.12)	0.96 (0.39)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.3.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the La Grange Pool of the Illinois River using stratified random sampling during 1998. The statistics under ALL pertain to unbiased means over all strata sampled using this gear (as indicated by nonmissing entries below and by Table 6.1). See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	ALL	BWCS	MCBU	SCB
Smallmouth bass	0.04 (0.02)	0.08 (0.06)	0.03 (0.03)	0.00 (0.00)
Largemouth bass	0.38 (0.08)	1.08 (0.26)	0.11 (0.05)	0.42 (0.21)
White crappie	0.06 (0.04)	0.25 (0.17)	0.00 (0.00)	0.00 (0.00)
Black crappie	0.08 (0.06)	0.25 (0.21)	0.03 (0.03)	0.00 (0.00)
Mud darter	0.04 (0.04)	0.00 (0.00)	0.06 (0.06)	0.00 (0.00)
Johnny darter	0.02 (0.01)	0.08 (0.06)	0.00 (0.00)	0.00 (0.00)
Logperch	0.04 (0.03)	0.17 (0.10)	0.00 (0.00)	0.04 (0.04)
Blackside darter	0.01 (0.01)	0.04 (0.04)	0.00 (0.00)	0.00 (0.00)
Slenderhead darter	0.05 (0.03)	0.04 (0.04)	0.06 (0.04)	0.00 (0.00)
Sauger	0.09 (0.03)	0.17 (0.08)	0.06 (0.04)	0.13 (0.09)
Walleye	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.04)
Freshwater drum	0.42 (0.14)	0.38 (0.12)	0.42 (0.19)	0.75 (0.35)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	SCB	TWZ
Paddlefish	0.00 (0.00)	0.17 (0.17)
Spotted gar	0.33 (0.21)	0.00 (0.00)
Longnose gar	0.17 (0.17)	0.33 (0.14)
Shortnose gar	0.83 (0.83)	0.08 (0.08)
Bowfin	0.00 (0.00)	0.17 (0.17)
Mooneye	0.00 (0.00)	0.08 (0.08)
Skipjack herring	5.00 (4.22)	6.42 (3.71)
Gizzard shad	447.67 (383.52)	134.75 (72.88)
Threadfin shad	0.33 (0.21)	7.50 (3.52)
Central stoneroller	0.17 (0.17)	0.00 (0.00)
Goldfish	0.00 (0.00)	0.25 (0.13)
Grass carp	0.00 (0.00)	0.25 (0.18)
Red shiner	0.00 (0.00)	0.17 (0.17)
Common carp	16.83 (4.53)	11.42 (2.25)
Carp x goldfish hybrid	0.00 (0.00)	0.58 (0.40)
Silver chub	0.17 (0.17)	0.00 (0.00)
Golden shiner	0.00 (0.00)	0.08 (0.08)
Emerald shiner	2.17 (1.64)	54.25 (52.89)
Silverband shiner	0.00 (0.00)	0.08 (0.08)
Bullhead minnow	0.33 (0.21)	0.17 (0.17)
River carpsucker	0.17 (0.17)	0.50 (0.19)
Smallmouth buffalo	6.17 (3.45)	3.92 (1.29)
Bigmouth buffalo	7.33 (3.38)	0.33 (0.26)
Black buffalo	0.67 (0.49)	0.00 (0.00)
Golden redhorse	0.00 (0.00)	0.08 (0.08)
Shorthead redhorse	0.33 (0.21)	2.25 (1.14)
Black bullhead	0.00 (0.00)	0.08 (0.08)
Yellow bullhead	0.00 (0.00)	0.08 (0.08)
Channel catfish	1.33 (0.80)	0.75 (0.58)
Flathead catfish	0.67 (0.33)	0.50 (0.26)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.1. Mean catch-per-unit-effort and (standard error) for fishes collected by using day electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	SCB	TWZ
Northern pike	0.00 (0.00)	0.08 (0.08)
Brook silverside	0.00 (0.00)	0.25 (0.25)
White perch	0.00 (0.00)	0.67 (0.43)
White bass	22.83 (6.90)	66.83 (21.59)
Yellow bass	0.00 (0.00)	1.25 (0.63)
Striped bass	0.00 (0.00)	0.08 (0.08)
Green sunfish	0.00 (0.00)	0.58 (0.23)
Warmouth	0.33 (0.21)	0.00 (0.00)
Bluegill	18.33 (5.68)	22.00 (7.05)
Smallmouth bass	0.00 (0.00)	0.33 (0.14)
Largemouth bass	3.33 (1.36)	4.50 (1.19)
White crappie	1.83 (0.79)	2.17 (0.84)
Black crappie	1.83 (0.75)	2.33 (0.96)
Mud darter	0.17 (0.17)	0.00 (0.00)
Sauger	0.50 (0.22)	4.33 (1.23)
Walleye	0.00 (0.00)	0.25 (0.25)
Freshwater drum	1.67 (0.71)	1.50 (0.44)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	SCB	TWZ
Spotted gar	0.00 (0.00)	0.09 (0.09)
Longnose gar	1.40 (0.98)	0.64 (0.28)
Shortnose gar	1.20 (0.97)	0.64 (0.15)
Goldeye	0.00 (0.00)	0.27 (0.27)
Skipjack herring	0.20 (0.20)	2.82 (1.86)
Gizzard shad	117.20 (56.27)	173.27 (42.19)
Threadfin shad	0.80 (0.58)	4.18 (2.47)
Goldfish	0.00 (0.00)	0.36 (0.24)
Grass carp	0.40 (0.40)	0.00 (0.00)
Common carp	19.60 (6.40)	21.55 (7.71)
Carp x goldfish hybrid	0.00 (0.00)	0.18 (0.12)
Golden shiner	0.00 (0.00)	0.27 (0.19)
Emerald shiner	0.60 (0.40)	18.27 (17.97)
Silverband shiner	0.00 (0.00)	0.27 (0.27)
Bullhead minnow	0.20 (0.20)	0.09 (0.09)
River carpsucker	0.60 (0.24)	0.64 (0.34)
Highfin carpsucker	0.20 (0.20)	0.00 (0.00)
White sucker	0.00 (0.00)	0.09 (0.09)
Smallmouth buffalo	6.20 (3.38)	10.09 (3.12)
Bigmouth buffalo	6.00 (3.36)	3.91 (1.46)
Black buffalo	0.40 (0.40)	0.18 (0.12)
Unidentified buffalo	0.00 (0.00)	0.09 (0.09)
Shorthead redhorse	0.00 (0.00)	0.09 (0.09)
Channel catfish	0.40 (0.24)	0.82 (0.82)
Flathead catfish	0.00 (0.00)	0.73 (0.27)
Brook silverside	0.60 (0.60)	0.27 (0.19)
White perch	0.00 (0.00)	1.55 (0.62)
White bass	8.40 (4.52)	68.73 (19.69)
Yellow bass	0.00 (0.00)	1.36 (0.54)
Striped bass	0.00 (0.00)	0.27 (0.27)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.4.2. Mean catch-per-unit-effort and (standard error) for fishes collected by using night electrofishing in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	SCB	TWZ
Striped x white bass	0.00 (0.00)	0.45 (0.28)
Green sunfish	0.00 (0.00)	0.36 (0.20)
Orangespotted sunfish	0.00 (0.00)	0.18 (0.12)
Bluegill	13.20 (6.79)	17.73 (4.86)
Smallmouth bass	0.00 (0.00)	0.18 (0.12)
Largemouth bass	2.60 (1.21)	3.45 (0.71)
White crappie	1.00 (0.55)	0.91 (0.21)
Black crappie	1.20 (0.73)	0.82 (0.23)
Sauger	0.40 (0.24)	10.55 (2.94)
Walleye	0.00 (0.00)	0.64 (0.34)
Freshwater drum	5.60 (1.63)	11.27 (8.27)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.3. Mean catch-per-unit-effort and (standard error) for fishes collected by using fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Spotted gar	0.08 (0.08)
Longnose gar	0.91 (0.40)
Shortnose gar	3.10 (1.31)
Skipjack herring	0.59 (0.37)
Gizzard shad	8.64 (3.34)
Threadfin shad	2.38 (1.51)
Goldfish	0.16 (0.16)
Common carp	1.35 (0.84)
River carpsucker	1.97 (1.79)
Quillback	0.17 (0.17)
Smallmouth buffalo	2.55 (2.18)
Black buffalo	0.09 (0.09)
Shorthead redhorse	1.07 (0.68)
Channel catfish	0.17 (0.11)
Northern pike	0.25 (0.18)
White perch	0.99 (0.58)
White bass	59.99 (22.60)
Yellow bass	0.49 (0.33)
Striped x white bass	0.08 (0.08)
Green sunfish	0.25 (0.18)
Bluegill	15.18 (4.93)
Largemouth bass	0.50 (0.23)
White crappie	1.60 (0.42)
Black crappie	3.88 (1.60)
Sauger	3.24 (1.83)
Walleye	0.41 (0.26)
Freshwater drum	7.74 (5.68)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	SCB	TWZ
Longnose gar	0.16 (0.16)	0.00 (0.00)
Shortnose gar	0.18 (0.18)	0.08 (0.08)
Skipjack herring	0.16 (0.16)	0.09 (0.09)
Gizzard shad	82.98 (40.89)	181.64 (171.52)
Threadfin shad	0.00 (0.00)	0.08 (0.08)
Central stoneroller	0.18 (0.18)	0.00 (0.00)
Red shiner	1.04 (0.67)	0.09 (0.09)
Common carp	0.00 (0.00)	1.05 (0.96)
Silver chub	0.16 (0.16)	0.00 (0.00)
Golden shiner	0.67 (0.33)	0.00 (0.00)
Emerald shiner	14.29 (7.69)	662.34 (659.36)
Spottail shiner	0.00 (0.00)	1.88 (1.47)
Silverband shiner	0.16 (0.16)	0.17 (0.12)
Bluntnose minnow	0.17 (0.17)	0.69 (0.41)
Bullhead minnow	0.85 (0.47)	0.25 (0.13)
Creek chub	0.00 (0.00)	1.79 (1.79)
River carpsucker	0.17 (0.17)	0.09 (0.09)
White sucker	0.00 (0.00)	0.77 (0.77)
Unidentified buffalo	0.18 (0.18)	2.01 (1.83)
Shorthead redhorse	0.00 (0.00)	0.41 (0.22)
Black bullhead	0.17 (0.17)	1.10 (0.61)
Yellow bullhead	0.16 (0.16)	0.35 (0.35)
Brown bullhead	0.00 (0.00)	0.09 (0.09)
Channel catfish	1.01 (0.68)	0.17 (0.11)
Flathead catfish	0.00 (0.00)	0.09 (0.09)
Western mosquitofish	1.01 (0.68)	0.00 (0.00)
Brook silverside	0.65 (0.65)	0.00 (0.00)
White perch	0.00 (0.00)	0.25 (0.18)
White bass	36.95 (25.45)	34.12 (17.99)
Green sunfish	0.00 (0.00)	0.67 (0.26)

Strata: BWCS - Backwater, contiguous, shoreline
 BWCO - Backwater, contiguous, offshore
 IMPS - Impounded, shoreline
 IMPO - Impounded, offshore
 MCBU - Main channel border, unstructured

MCBW - Main channel border, wing dam
 SCB - Side channel border
 TRI - Tributary mouth
 TWZ - Tailwater

Table 6.4.4. Mean catch-per-unit-effort and (standard error) for fishes collected by using mini fyke netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 2

Common name	SCB	TWZ
Warmouth	0.17 (0.17)	0.00 (0.00)
Orangespotted sunfish	0.49 (0.49)	0.17 (0.17)
Bluegill	13.05 (11.86)	5.01 (1.52)
Largemouth bass	5.49 (4.67)	0.51 (0.27)
White crappie	2.66 (1.71)	0.75 (0.39)
Black crappie	1.64 (1.15)	0.42 (0.15)
Mud darter	0.34 (0.22)	0.17 (0.11)
Logperch	0.82 (0.53)	0.59 (0.37)
Slenderhead darter	0.17 (0.17)	0.00 (0.00)
Sauger	0.67 (0.33)	1.75 (0.70)
Freshwater drum	2.52 (1.50)	1.00 (0.42)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.5. Mean catch-per-unit-effort and (standard error) for fishes collected by using small hoop netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	SCB	TWZ
Common carp	0.34 (0.25)	6.22 (1.90)
Smallmouth buffalo	0.00 (0.00)	0.25 (0.21)
Channel catfish	0.00 (0.00)	0.04 (0.04)
Flathead catfish	0.00 (0.00)	0.04 (0.04)
White bass	0.00 (0.00)	0.04 (0.04)
Freshwater drum	0.09 (0.09)	0.04 (0.04)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.6. Mean catch-per-unit-effort and (standard error) for fishes collected by using large hoop netting in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	SCB	TWZ
Grass carp	0.00 (0.00)	0.04 (0.04)
Common carp	6.01 (2.54)	7.06 (2.19)
River carpsucker	0.00 (0.00)	0.08 (0.08)
Smallmouth buffalo	0.25 (0.17)	7.46 (4.38)
Channel catfish	0.00 (0.00)	0.51 (0.21)
Flathead catfish	0.08 (0.08)	0.25 (0.17)
Freshwater drum	0.33 (0.24)	2.95 (1.62)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.7. Mean catch-per-unit-effort and (standard error) for fishes collected by using seining in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	SCB
Skipjack herring	0.25 (0.13)
Gizzard shad	7.83 (5.47)
Threadfin shad	0.67 (0.43)
Silver chub	0.67 (0.67)
Emerald shiner	12.92 (6.05)
Silverband shiner	0.25 (0.25)
Bluntnose minnow	0.08 (0.08)
Bullhead minnow	1.00 (0.39)
Channel catfish	0.08 (0.08)
Western mosquitofish	1.50 (0.67)
Brook silverside	0.17 (0.17)
White bass	1.83 (0.55)
Bluegill	3.00 (1.04)
Largemouth bass	0.58 (0.26)
White crappie	0.08 (0.08)
Black crappie	0.25 (0.25)
Freshwater drum	0.75 (0.35)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
 BWCO - Backwater, contiguous, offshore SCB - Side channel border
 IMPS - Impounded, shoreline TRI - Tributary mouth
 IMPO - Impounded, offshore TWZ - Tailwater
 MCBU - Main channel border, unstructured

Table 6.4.8. Mean catch-per-unit-effort and (standard error) for fishes collected by using bottom trawling in the La Grange Pool of the Illinois River using fixed-site sampling during 1998. See text for definitions of catch-per-unit-effort and standard error.

Table page: 1

Common name	TWZ
Channel catfish	1.42 (0.84)
Stonecat	0.04 (0.04)
Sauger	0.04 (0.04)
Freshwater drum	0.79 (0.23)

Strata: BWCS - Backwater, contiguous, shoreline MCBW - Main channel border, wing dam
BWCO - Backwater, contiguous, offshore SCB - Side channel border
IMPS - Impounded, shoreline TRI - Tributary mouth
IMPO - Impounded, offshore TWZ - Tailwater
MCBU - Main channel border, unstructured

Gizzard shad Electrofishing n= 17894

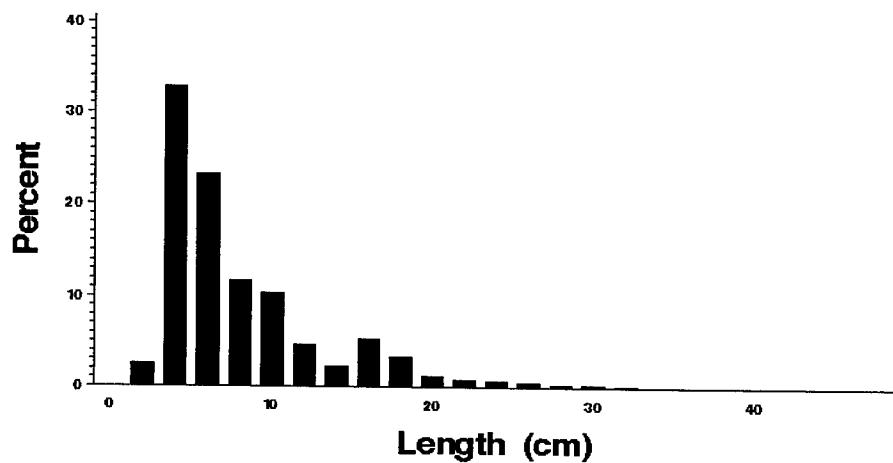


Figure 6.2. Length distributions (length) as a percentage of catch (percent) for gizzard shad (*Dorosoma cepedianum*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

Common carp Electrofishing n= 1927

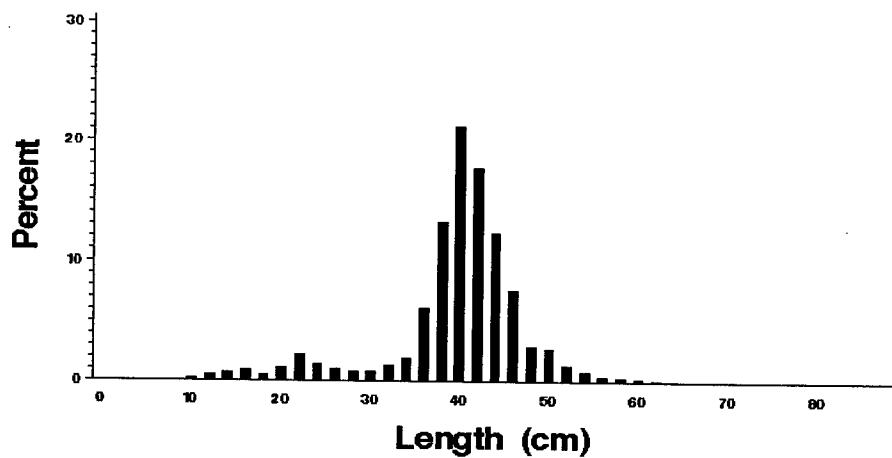


Figure 6.3. Length distributions (length) as a percentage of catch (percent) for common carp (*Cyprinus carpio*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

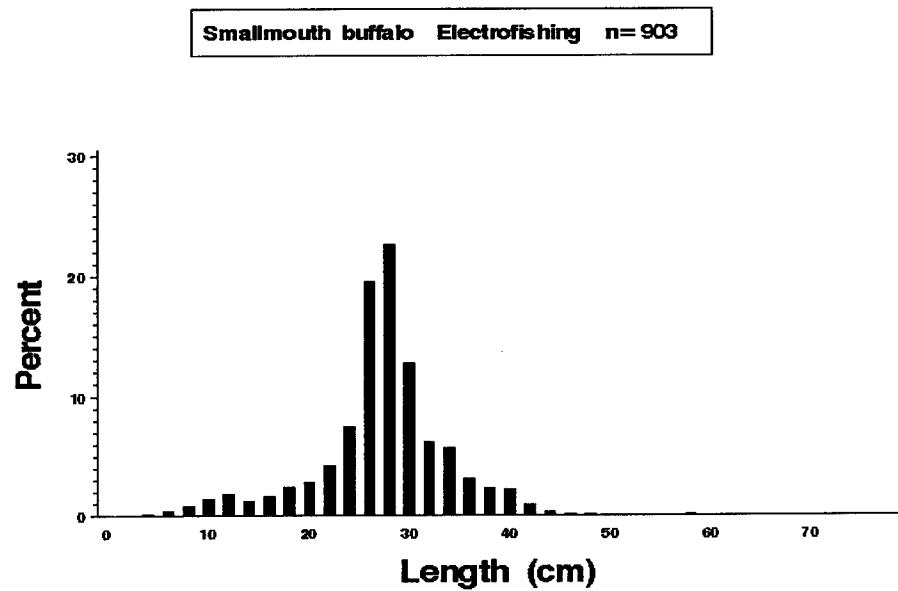


Figure 6.4. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

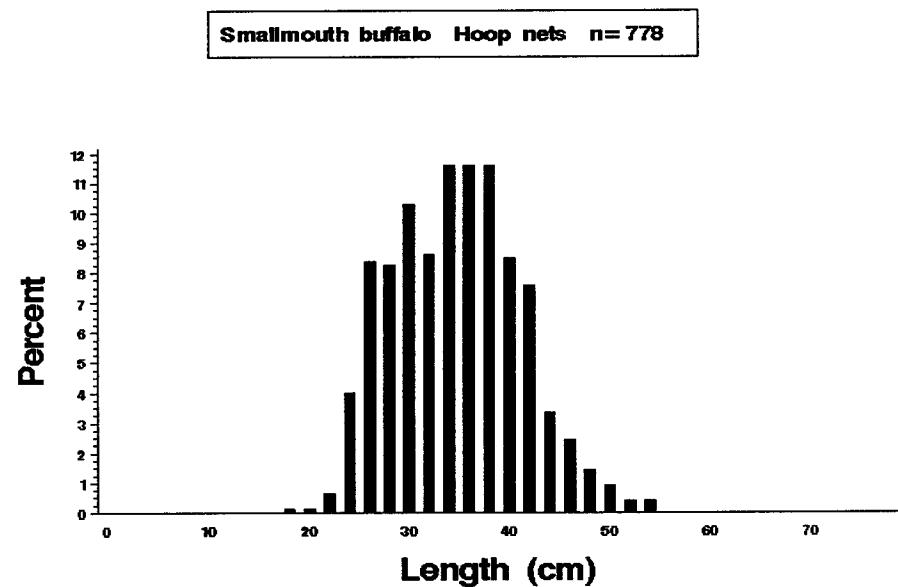


Figure 6.5. Length distributions (*length*) as a percentage of catch (*percent*) for smallmouth buffalo (*Ictiobus bubalus*) collected by small and large hoop netting in the Illinois River, La Grange Pool during 1998.

Channel catfish Electrofishing n=229

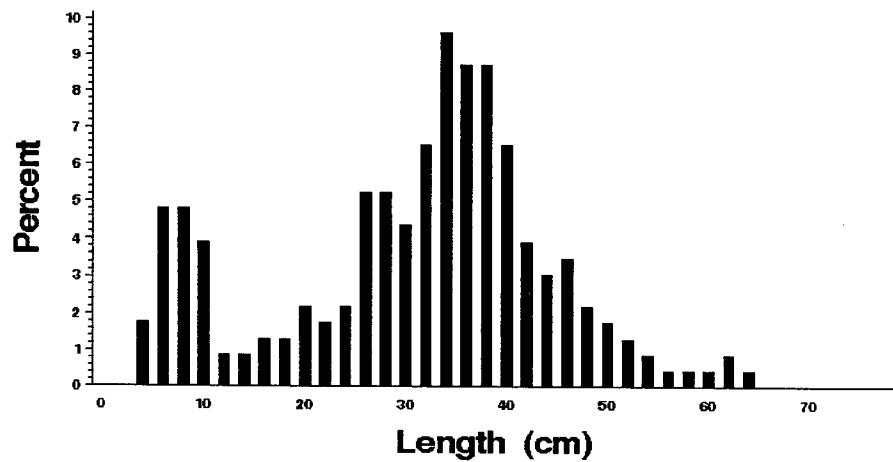


Figure 6.6. Length distributions (length) as a percentage of catch (percent) for channel catfish (*Ictalurus punctatus*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

Channel catfish Hoop nets n=1065

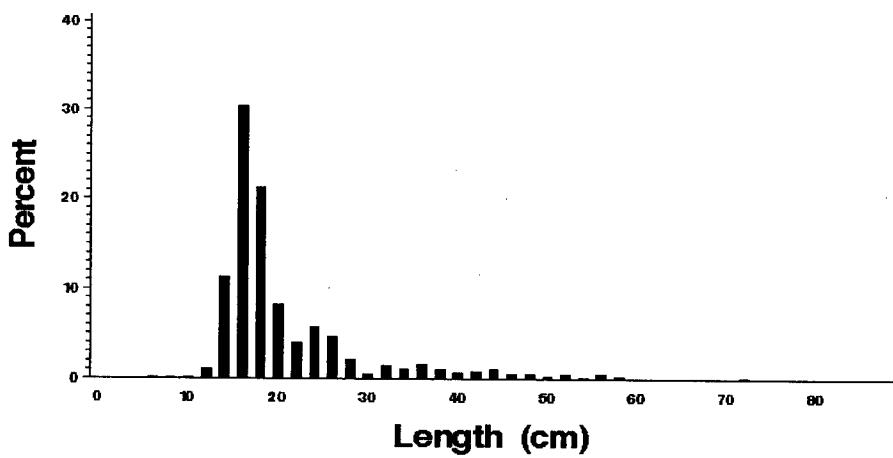


Figure 6.7. Length distributions (length) as a percentage of catch (percent) for channel catfish (*Ictalurus punctatus*) collected by small and large hoop netting in the Illinois River, La Grange Pool during 1998.

White bass Electrofishing n=3099

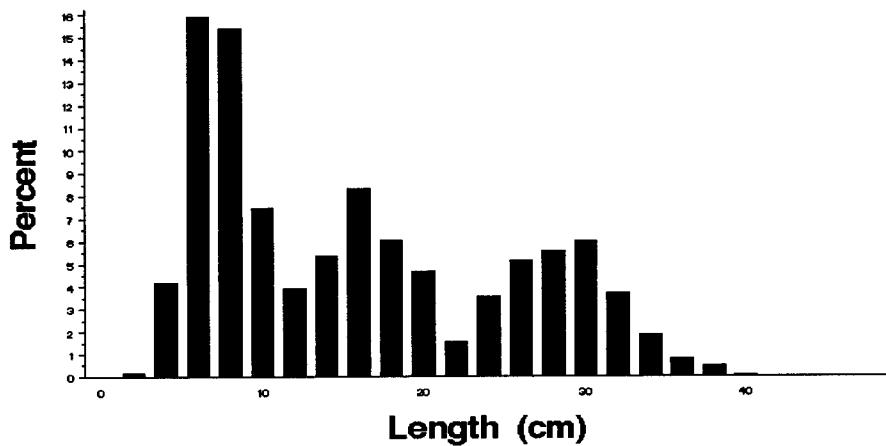


Figure 6.8. Length distributions (length) as a percentage of catch (percent) for white bass (*Morone chrysops*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

Bluegill Electrofishing n=2451

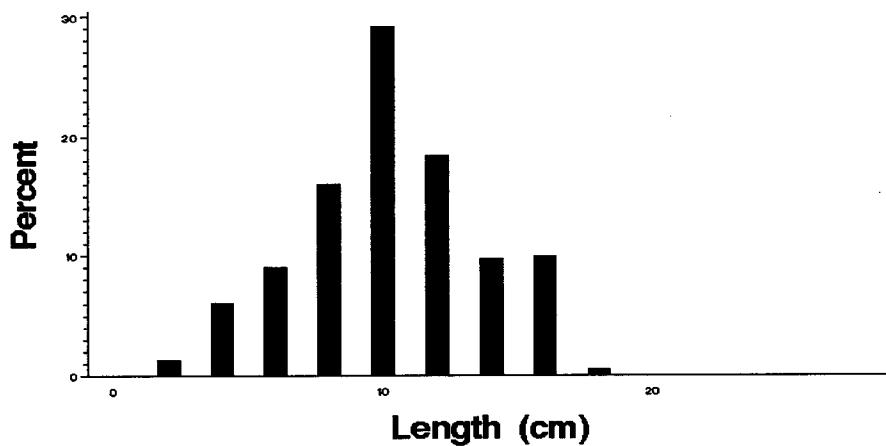


Figure 6.9. Length distributions (length) as a percentage of catch (percent) for bluegill (*Lepomis macrochirus*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

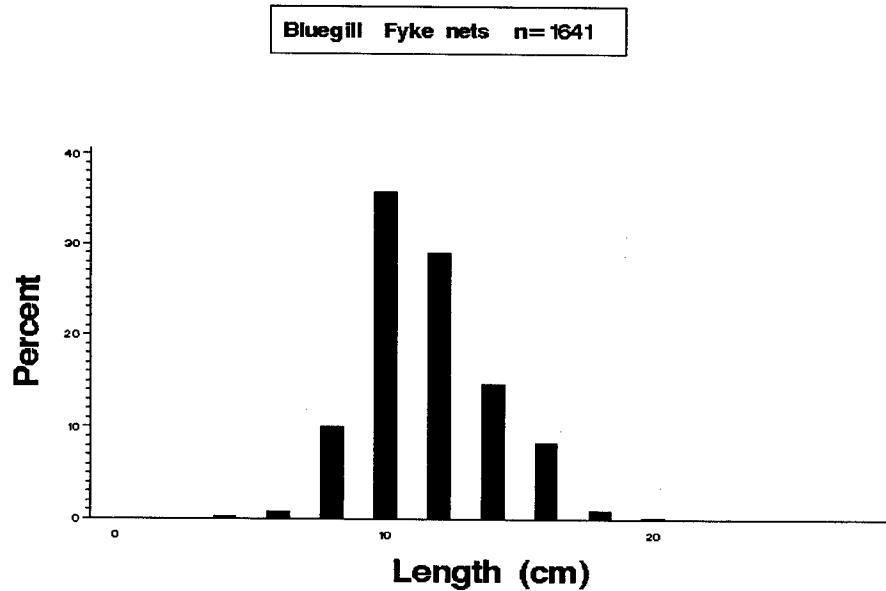


Figure 6.10. Length distributions (*length*) as a percentage of catch (*percent*) for bluegill (*Lepomis macrochirus*) collected by fyke netting in the Illinois River, La Grange Pool during 1998.

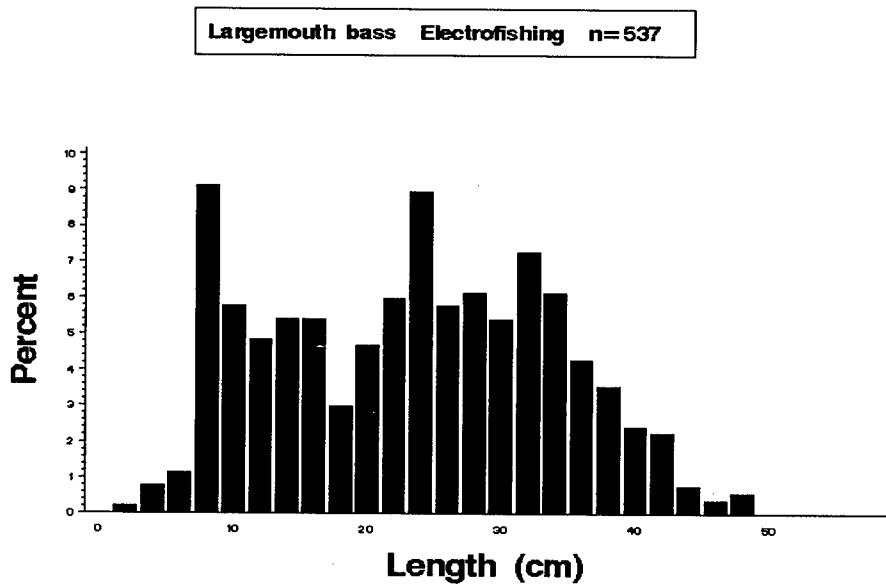


Figure 6.11. Length distributions (*length*) as a percentage of catch (*percent*) for largemouth bass (*Micropterus salmoides*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

White crappie Fyke nets n=190

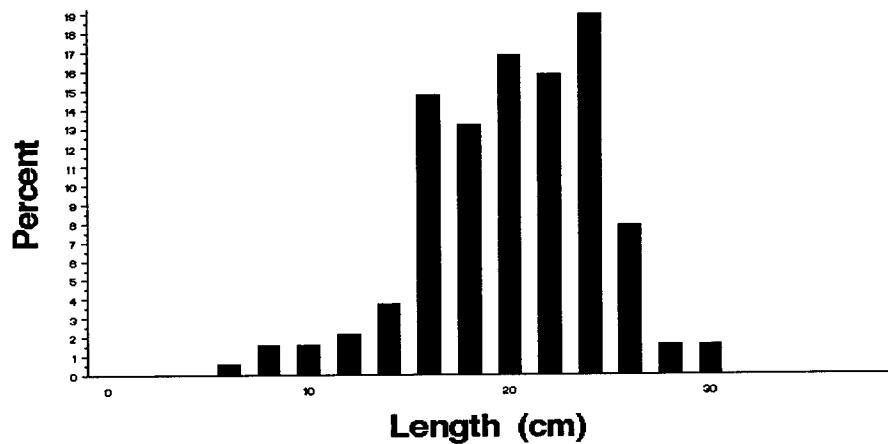


Figure 6.12. Length distributions (length) as a percentage of catch (percent) for white crappie (*Pomoxis annularis*) collected by fyke netting in the Illinois River, La Grange Pool during 1998.

Black crappie Fyke nets n=534

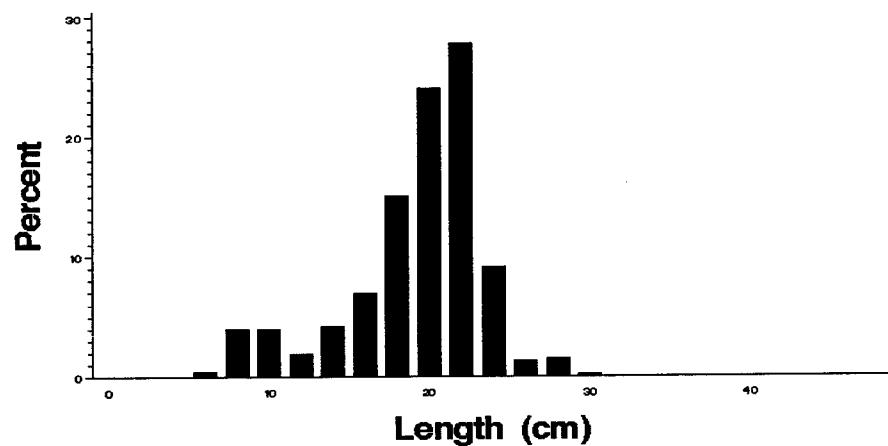


Figure 6.13. Length distributions (length) as a percentage of catch (percent) for black crappie (*Pomoxis nigromaculatus*) collected by fyke netting in the Illinois River, La Grange Pool during 1998.

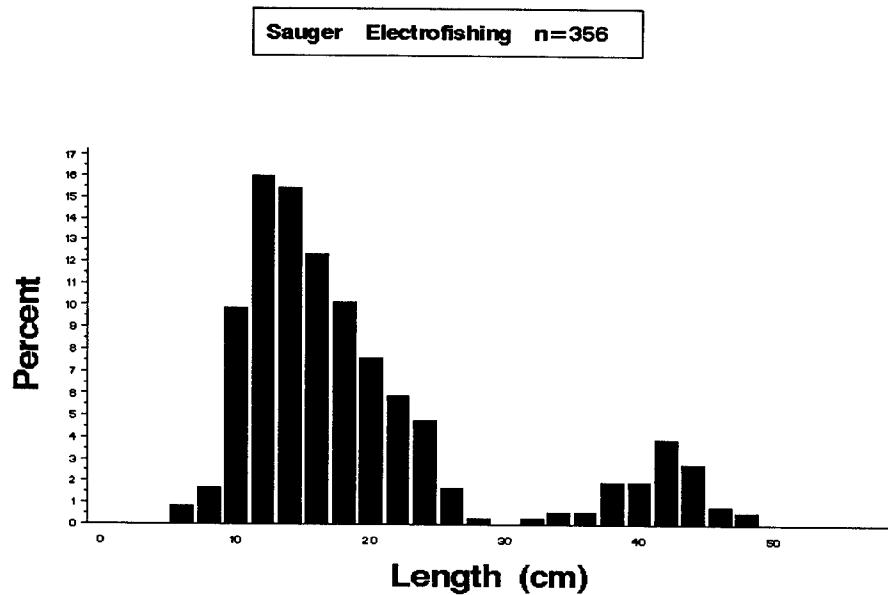


Figure 6.14. Length distributions (*length*) as a percentage of catch (*percent*) for sauger (*Stizostedion canadense*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

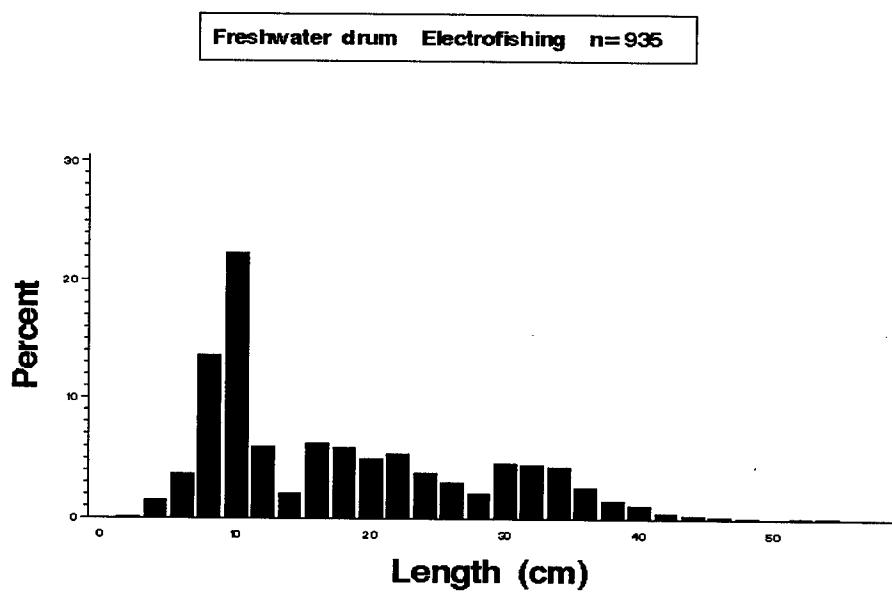


Figure 6.15. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplochiton grunniens*) collected by electrofishing in the Illinois River, La Grange Pool during 1998.

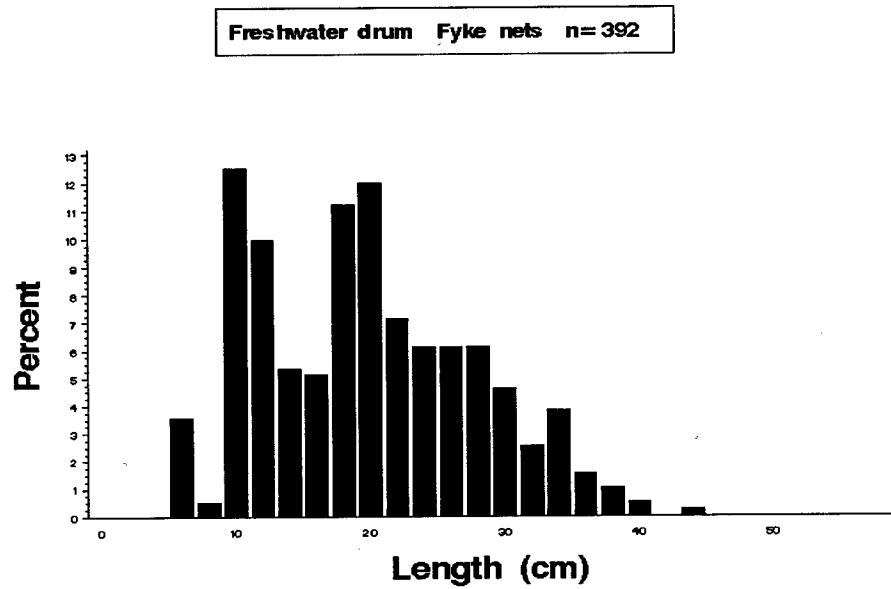


Figure 6.16. Length distributions (*length*) as a percentage of catch (*percent*) for freshwater drum (*Aplodinotus grunniens*) collected by fyke netting in the Illinois River, La Grange Pool during 1998.

REPORT DOCUMENTATION PAGE		Form Approved OMB No. 0704-0188	
<p>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, D.C. 20503</p>			
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
	June 2000		
4. TITLE AND SUBTITLE		5. FUNDING NUMBERS	
1998 Annual Status Report: A summary of fish data in six reaches of the Upper Mississippi River System			
6. AUTHOR(S)			
Randy W. Burkhardt, ¹ Steve DeLain, ² Eric Kramer, ³ Andrew Bartels, ³ Melvin C. Bowler, ⁴ Frederick A. Cronin, ⁵ Michael D. Petersen, ⁶ David P. Herzog, ⁶ Timothy M. O'Hara, ⁷ and Kevin S. Irons ⁷			
7. PERFORMING ORGANIZATION NAME AND ADDRESS		8. PERFORMING ORGANIZATION REPORT NUMBER	
¹ U.S. Geological Survey, Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Road, La Crosse, Wisconsin 54603; ² Minnesota Department of Natural Resources, LTRMP Lake City Field Station, 1801 S. Oak Street, Lake City, Minnesota 55041; ³ Wisconsin Department of Natural Resources, LTRMP Pool 8 Field Station, 575 Lester Avenue, Onalaska, Wisconsin 54650; ⁴ Iowa Department of Natural Resources, LTRMP Mississippi River Monitoring Field Station, 206 Rose Street, Bellevue, Iowa 52031; ⁵ Illinois Natural History Survey, LTRMP Great Rivers Field Station, 8450 Montclair, Brighton, Illinois 62012; ⁶ Missouri Department of Conservation, LTRMP Open River Field Station, 3815 E. Jackson Boulevard, Jackson, Missouri 63755; and ⁷ Illinois Natural History Survey, LTRMP Havana Field Station, 704 N. Schrader Avenue, Havana, Illinois 62644			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
U.S. Geological Survey Upper Midwest Environmental Sciences Center 2630 Fanta Reed Road La Crosse, Wisconsin 54603		2000-P004	
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION/AVAILABILITY STATEMENT		12b. DISTRIBUTION CODE	
Release unlimited. Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (1-800-553-6847 or 703-487-4650). Available to registered users from the Defense Technical Information Center, Attn: Help Desk, 8725 Kingman Road, Suite 0944, Fort Belvoir, VA 22060-6218 (1-800-225-3842 or 703-767-9050).			
13. ABSTRACT (Maximum 200 words)			
<p>The Long Term Resource Monitoring Program (LTRMP) completed 2,664 collections of fishes from stratified random and permanently fixed sampling locations in six study reaches of the Upper Mississippi River System during 1998. Collection methods included day and night electrofishing, hoop netting, fyke netting (two net sizes), gill netting, seining, and trawling in select aquatic area classes. The six LTRMP study reaches are Pools 4 (excluding Lake Pepin), 8, 13, and 26 of the Upper Mississippi River, an unimpounded reach of the Mississippi River near Cape Girardeau, Missouri, and the La Grange Pool of the Illinois River. A total of 63-75 fish species were detected in each study reach. For each of the six LTRMP study reaches, this report contains summaries of (1) sampling efforts for each combination of gear type and aquatic area class, (2) total catches of each species from each gear type, (3) mean catch-per-unit of effort statistics and standard errors for common species from each combination of aquatic area class and selected gear type, and (4) length distributions of common species from selected gear types.</p>			
14. SUBJECT TERMS		15. NUMBER OF PAGES	
1998 annual report, fish, LTRMP, Mississippi River		14 pp. + Chapters 1-6	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	